

# Railway Age

Vol. 85      October 27, 1928      No. 17



Track Exhibit at N. Y., N. H. & H. Yards, New Haven, Conn., at Recent A. I. E. E. Meeting

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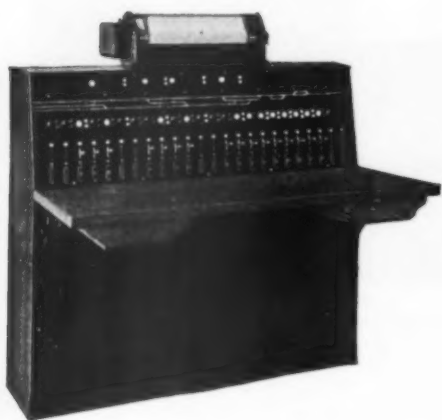
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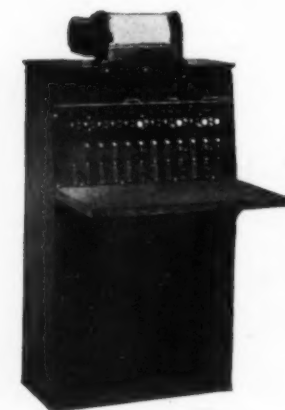
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# 14 Applications of G-R-S



Dallas to Ft. Worth—T. & P. Ry.

**T**HIS machine is being installed for the dispatching of traffic over a busy section of track on the Texas & Pacific Ry.—20 miles of double track and 10 miles of single track between Dallas and Ft. Worth, Texas. It will control 18 switches and 35 signals, automatically "OS" trains from 17 points and produce a train sheet record.



Medicine Hat to Dunmore  
C. P. Ry.

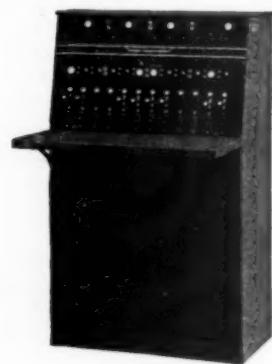
**T**HIS machine dispatches traffic over 9 miles of single track between Medicine Hat and Dunmore on the Canadian Pacific Ry. It controls 2 switches, 6 signals, 1 outlying switch lock at a branch line junction, automatically "OS"es trains from 4 locations and produces a train sheet record.

Hill Street Crossing—C. B. & Q. R. R.



**T**HIS machine will control train movements over a grade crossing between the C. B. & Q. R. R. and the U. P. R. R. at Hill St., Lincoln, Nebraska. It will be located 11½ miles from the crossing where an operator is required for other duties and dispenses with the use of a mechanical interlocking plant at the crossing.

A similar type of installation is being made by the C. B. & Q. R. R. at Sullivan, Wis., for the remote control of 2 cross-overs, 3 derails and associate signals on double track.



North Chelmsford to Ayer  
B. & M. R. R.

**T**HIS machine is being installed to increase the capacity of 13 miles of double track between North Chelmsford and Ayer on the Boston & Maine R. R. Each track is being signalled for traffic in both directions. The machine will control leaving signals at each end of the section and a center siding with its 6 switches and associate signals. Trains are automatically "OS"ed from 8 points.

## GENERAL RAILWAY SIGNAL COMPANY

# Railway Age

Vol. 85, No. 17

October 27, 1928

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## Using New Facilities

**T**HE new yard of the Pennsylvania at Crestline, Ohio, was planned, with certain operating improvements in mind. On the basis of the savings to accrue from these improvements, authority was granted for the necessary expenditure, after careful consideration. So far, the procedure differed not at all from thousands of similar cases. But, after the authority was granted, the operating officers of the Pennsylvania did not sit supinely and wait for the yard to be built. They co-operated closely with the engineers in charge of the design, so that the facility would be satisfactory from both an engineering and an operating standpoint. Some weeks before the yard was completed, all superintendents for whose divisions classifications were to be made at the yard, were called upon to submit lists of the classifications they desired. With these lists as a basis, the ideal proposed operation was worked out and applied to the practical conditions. The employees who were to use the facility were given painstaking and thorough advance instructions. The result was that, some weeks before the yard was opened, everyone concerned knew exactly what was to be done. When the yard was opened, the expected operating improvements were made effective at once. There was no period of trial and error and the methods to be used were not left to chance. There was no transitory period of costly experiences in doing the wrong thing to discover what the right thing was. There have been other instances on other railways where a new facility was as efficiently utilized from the beginning. Crestline yard is cited merely as the current example of what should be done. Unfortunately, the practice of obtaining the maximum utilization from a new facility is not as widespread as it should be. The savings accruing are by no means negligible and therefore should not be overlooked.

## An Alert Competitor

**M**OTOR coach and trucking companies engaged in long-haul business are, according to their own statements, prospering. One of the speakers at the transportation meeting of the Society of Automotive Engineers, which was held in Newark, N. J., October 17 to 19, inclusive, predicted hourly motor coach service between New York and Los Angeles, Cal., in the near future. At the present time, competition among motor coach and trucking companies is keen. The trend, however, is toward consolidation of competing lines and the rapid building up of a few strong companies. These companies, especially those engaged in long-haul business between a number of cities, are able to put the "fly-by-night" operators out of business in short order

when they desire to do so. In case a "rate war" develops, the company operating lines between a number of cities can easily reduce its rates to a point where its competitor operating between only two cities must operate at a loss or go out of business. Many of the events now occurring in the development of highway transportation, have similar aspects to those that occurred in the early history of the railroads. In discussing long haul transportation at the Newark meeting of the Society of Automotive Engineers, the question of federal regulation naturally came up. One of the speakers stated that federal regulation was desired by companies operating interstate service, for it meant stabilization of the business. Once the business becomes stabilized, however, he expects real competition from the railroads. At the present time it is the policy of the larger companies engaged in long-haul highway transportation to improve their plant and equipment as much as possible. Placing themselves in a position to render the best possible service is an important factor in meeting competition. Thus, by the time that the railroads decide to enter the field, these companies expect to be strongly entrenched.

## Diversification Applied to Railroads

**R**AILROAD industrial and agricultural development departments are performing a valuable service for railroad patrons in widening their knowledge of opportunities for improving their efficiency of production. Such effort by the railroads is not, of course, entirely unselfish, since the railroads cannot prosper unless their patrons prosper. One of the principal messages of the railroad agricultural departments to the farmers is: Diversify! The one-crop farmer is urged constantly to take a few acres from his cotton field or his corn or wheat field and devote them to poultry or dairying or fruit or vegetables. By this device a blight on the principal crop will not leave the farmer helpless. If this doctrine of diversification is sound for agriculture, and it must be when the government departments and publicists generally advocate it so strongly, why is it not also a good policy for the transportation industry? If companies operating railroads should also operate motor vehicles, ships and airplanes, any shift in public favor from one method of transportation to another would presumably have less disastrous effects than if the companies were restricted to one method and one only. If prosperous transportation companies are a public asset, as prosperous farms and prosperous industries are, then should not the government, instead of discouraging diversification in transporting methods offered by one company, as it does at present, instead actively encourage diversification in methods? The railroads have been virtually legislated out of the



business of water transportation and their legal right to operate on the highways is not entirely clear in some states. Should not a wise public policy remove such restrictions, and replace them with measures calculated to further an increase in the number of methods of transportation provided by the great companies incorporated as railroads?

## Track Surface and Car Derailments

ELSEWHERE in this issue appears an account of a series of tests under laboratory conditions to determine the effect of warped track surface as a cause of derailment of freight cars and the flange pressure required to turn the trucks under freight cars. These tests have led to certain conclusions contrary to the accepted beliefs of many competent engineers and railroad officers. By no means, however, do they completely exhaust the possibilities of similar research, and they are, perhaps, as valuable for the questions they have raised and the interest they have aroused as for the questions they have definitely answered. Among the definite conclusions indicated by these tests may be mentioned the following: That a rigid and a flexible truck are equally effective in resisting a tendency to derailment caused by warped track surface; that center-plate resistance plays little part in the total resistance which must be overcome in turning trucks on curves, and that grease lubrication of center plates has no appreciable effect on truck turning resistance.

One of the most interesting questions raised by the tests is the relation of side-bearing friction to derailments caused by warped track surface. In a single test in which the trucks were fitted with friction side bearings, the car derailed with a rail depression of 3-13/16 in. in the outside rail, which is precisely the amount of depression at which derailment occurred when the car was equipped with roller side bearings, the side-bearing clearance being 3/8 in. in both cases. No test was made with friction side bearings where the warped track surface was produced by super-elevation of the outside rail.

Shall we conclude from this that side-bearing friction plays no effective part among the forces causing derailment? In passing into a curve, the major portion of the guiding of the car is done by the flange of the outside front wheel of the leading truck. In the case of a depressed outer rail, side-bearing friction would appear to increase the pressure against the rail of the flange of the wheel which derails first under such track conditions. In the case of a super-elevation of the outside rail, the outside front wheel of the following truck is first to leave the rail. In this case, however, as the car body is being turned around the curve by the forward truck and, in turn, is tending to turn the rear truck into the curve, side-bearing friction acts in the opposite direction and should tend to reduce the pressure of the flange of this wheel against the rail.

Among the other forces which have to be considered are the resistance to slipping of the wheels, both circumferentially and axially, which must take place as the trucks move around the curve. This slipping is resisted by the entire weight on the truck its effectiveness in preventing slipping depending upon the coefficient of friction between the rail and the wheels. Under sufficiently severe conditions of track warp, the entire weight of a rigid car body may be carried by the two diagonally op-

posite side bearings and, with standard side-bearing spacing, this leaves but 15 to 17 per cent, instead of a normal 50 per cent, of the axle load on the wheel, lateral pressure on the flange of which must overcome the friction of rest between the rails and the wheels if the car is to stay on the track. In the case of a depressed outer rail, this friction is increased by the tendency of gravity to move the entire load on the forward truck toward the outer rail. In the case of super-elevation of the outer rail, the direction of the force of gravity is reversed and it tends to aid the reaction of the rail against the flange in keeping the truck on the track. Both gravity and side-bearing friction, therefore, would appear to affect the pressure of the derailing flange against the rail in the same direction.

It is interesting to note that, in general, derailment occurred with less depression than super-elevation of the outer rail, which is consistent with the above analyses. But, in the single case in which a comparison of the effect of the roller and friction side bearings was made, the difference in the side-bearing friction clearly made no difference in the amount of outside rail depression at which derailment occurred. A comparison of the amount of warp in the track surface at which derailments occurred, with the truck-turning resistances measured for approximately corresponding amounts of warp in the track surface and with corresponding side bearing clearances, indicates that derailments occurred under conditions which produced, roughly, from 3,000 to 4,000 lb. truck turning resistance with roller side bearings. The turning resistances with friction side bearings under the same conditions varied from 11,000 to 14,000 lb. In view of the fact that considerably higher resistances than these were encountered in the truck-turning resistance tests, one may infer that the derailments occurred before the load on the side bearings had reached its maximum, or, in other words, before the entire weight of the car body had been lifted from the center plates.

The flange pressure required to guide the trucks at the moment of derailment would appear to be increased by from 8,000 to 10,000 lb. by a substitution of friction side bearings for roller side bearings in the case of the leading truck, and decreased by a corresponding amount in the case of the trailing truck. Apparently such differences in force affecting the turning of the truck under the car body have no influence on the tendency of the flange of the derailing wheel to climb the rail. Before such a conclusion may be safely accepted as applying under all conditions, however, the confirmation of further comparative tests would seem to be needed.

It must be kept clearly in mind that these tests were made under essentially static conditions, and that this discussion applies only to such conditions. If the car were being pulled around the curve in a train, the effect of the lateral component of the oblique drawbar pulls at the ends of the car, tending to move the car body toward the inside of the curve, would have to be considered, and the dynamic effect of car roll might increase or decrease the derailing tendency.

In general, it is evident that side-bearing clearance is the most important single factor, so far as the car is concerned, affecting derailments caused by warped track surface, and it is evident that flexibility of car structures plays no small part in keeping cars on the track where side-bearing clearance is small or altogether absent.

These tests have thrown a flood of light on a highly important phase of the inter-action of rolling stock and track. They should stimulate an interest in the subject, leading to further study and tests to cover other questions pertaining to rolling stock operation.



## Mr. Hoover on State Socialism

REGARDLESS of political partisanship, and especially of the issues in the present political campaign, a large majority of business men, including railway officers, will approve the general views regarding the proper relations between government and business expressed by Herbert Hoover in his speech in New York on Monday night.

Mr. Hoover declared, in substance, that the policy of leaving the ownership of property and the management of business to private citizens, and of restricting as much as practicable government participation or interference in business, is distinctly an American policy. This will hardly be questioned by those familiar with the relations between business and government in the countries of the world. The people of the United States are the most wealthy and prosperous in the world. Mr. Hoover attributed this principally to methods of production and distribution initiated and developed by private enterprise stimulated by the hope and expectation of profits. He opposed every avoidable form of state socialism, both because government management usually is less efficient than private management, and because the increase of government ownership and management would necessitate a centralization and bureaucracy in government which would be a menace to the liberty of the people.

It is interesting and gratifying to railway officers and to many railway employees that Mr. Hoover found in our railroad history the best illustration in support of his views. "There is no better example of the practical incompetence of government to conduct business than the history of our railways," he said. He alluded to the unsatisfactory results of government operation, and pointed out the improvements in railway service, and in railway results, that have occurred during the last eight years. Among his significant statements was one which should make an impression on employees who are disposed to favor government ownership. "The wages of railway employees are today 121 per cent above pre-war," he said, "while the wages of government employees are today only 65 per cent above pre-war. That should be a sufficient commentary upon the efficiency of government operation."

Under the rule of both large political parties there has been for years too much that savors of socialism in the government's transportation policy. It is socialistic to regulate railway profits as has been and is being done. It would be generally recognized as socialistic if a similar policy were applied to all kinds of business. It can hardly be denied that the waterway policy of the government is socialistic. It includes government ownership and operation of a barge line on the Mississippi river system in direct competition with the railways. If it would be socialistic for the government to own and operate other means of production or transportation, or to engage in competition with its citizens, in other lines of business, then its ownership and operation of water carriers in competition with the railways is socialistic.

As has been repeatedly pointed out by the *Railway Age*, the socialistic tendencies so often manifested in the government's transportation policies are due not only to public men, but also to business men who profess to be opposed to "government in business," but who are constantly using their influence in behalf of more government in the transportation business.

Regardless of political partisanship, it is refreshing to have a candidate for president express himself so emphatically in defense and advocacy of the American system of private initiative and enterprise in business. As

Mr. Hoover's references to the railways indicates, the principle is just as applicable to transportation as to any other kind of business. It can hardly fail to have a beneficial effect upon public sentiment regarding the railroads to have important public men, whatever their politics, emphasize private management of railways and its results as evidences of the superiority of private enterprise to governmental bureaucracy in business.

## Shall Public Sentiment Govern Railway Policies?

TO what extent should the policies of railway managements be influenced by fear of public sentiment? This question is raised by almost daily developments, a good example of which is the recent revival in a certain wage controversy of the attacks that have been repeatedly made by labor leaders upon the salaries of railway officers. It has been asserted that by a general reduction in the salaries of officers the money could be provided for paying the advance in wages being demanded by one class of employees. From another source has come the claim that a general reduction in official salaries would make practicable a reduction of freight rates on farm products. The implication is, of course, that the salaries paid are excessive. The salaries of all officers, general and divisional are less than 2 per cent of operating expenses and less than 1½ per cent of earnings, but attacks upon them are renewed at frequent intervals.

Nobody would contend that railway directors and executives should disregard the probable effect upon public sentiment that would be produced by the widespread publication of the salaries paid to individual railway officers. They have been published in the past on the demand of Congress, and are likely to be in future. Consequently, when they are fixed the possibility of their publication, and the probable effect upon public sentiment, should be considered.

The important question is not as to whether the probable effect upon public sentiment should be considered, but as to the extent to which the size of the salaries fixed should be influenced by this consideration. The railroads are business concerns. Many of them rank among the very largest business concerns in the country. Nobody will question that it is desirable for them to be as ably managed as other large business concerns. If they are to be so managed they must be managed by as able men as other concerns. They are in competition with other business concerns for the best business brains in the country. This competition for the services of able men begins when they are young and continues more or less throughout their careers. Able and ambitious men, whether young or mature, inexperienced or experienced, go where they believe they will have the best opportunity. They do not measure opportunity entirely by a pecuniary standard, but certainly in most cases the incomes they believe they will make and the fortunes they believe they will accumulate are the most important factors in determining the kinds of business in which they engage and in which they do or do not remain.

This being the case, it is plain that railway directors and executives cannot expect, in the long run, to get and keep in the railway business men of the ability re-

quired to fill the higher official positions if they disregard the salaries received and the fortunes made by men occupying comparable positions in other lines of business. Now, it is well known that since before the war there have been very large increases in the salaries and other forms of income of the higher officers of big industrial, commercial and financial concerns. Not only have their salaries been increased, but there has been a growth of the practice of paying them bonuses based upon the net earnings made by their companies. There has been nowhere near a proportionate increase in the salaries of railway officers.

Railroading is a fascinating business, and experience indicates that it is not necessary to pay quite as much for brains in railroading as in most other lines of big business. It is, however, a fact which cannot be safely ignored, that for many years very few men of ability have left other lines of business to engage in railroading, while many men of ability have left railroading to engage in other lines of business. It is also a fact which should not be ignored that there has been for years a decline in the number of the most promising young men entering the railroad business as compared with the number entering other lines of business.

The paramount consideration in determining the salaries paid in the railroad industry should be how much it is necessary to pay to get and keep the kind of men needed to do the work, solve the problems, and carry the responsibilities involved in the successful management of vast business concerns the progressive, efficient and economical management of which is essential to the welfare of the American public. Railway directors and executives should be more afraid of not getting, developing and keeping such men than of the effect that may be produced upon public sentiment by paying enough to get and keep them. They should pay what is necessary to provide the railroad industry with the brains that it needs. Then, if there is criticism, they should try to create the right kind of public sentiment by presenting the reasons showing that this policy is not only desirable, but necessary.

The same general principle should be applied in determining all other policies which may have an effect upon public sentiment. Public sentiment, actual or apprehended, should not prevent the adoption of any policy which railway directors and executives believe is in the interest of good railroad management and, therefore, conducive to the public welfare. The policy believed to be sound should be adopted and then explained and defended to whatever extent may be necessary. There should be a wholesome fear of the effect that may be produced by unsound policies, but no fear of public sentiment regarding sound policies. In the long run if unsound policies are followed the railroad industry will come to grief. It cannot be successfully managed excepting by following sound policies. If, in the long run, the industry must come to grief because of an unintelligent and unfriendly public sentiment, it will be better for everybody concerned to have the railways well managed meantime than poorly managed. Under the conditions that now exist there can be no form of good management in which courage is not one of the most important elements—the courage to do the thing that ought to be done, and to defend it when it is criticised.

## Waterway Claims and Results

**A**GITATION for large government expenditures to revive transportation on inland waterways is not new in this country. Seldom, or never, since the primacy of the railways as freight carriers was established, however, has there been so much agitation of this kind as now. Because of current interest in the subject, the *Railway Age* publishes this week the first of two articles on the federal government's barge line on the Mississippi and Warrior rivers.

As in the past, the expense that will be incurred in providing inland water transportation is minimized in contemporary discussions, and large claims are made as to the traffic that will be carried and the cheapening of transportation that will result. It is significant that the advocates of inland waterways seldom cite experience in support of their programme and predictions. The most illuminating experience of the kind in this country has been that of New York state with the Erie barge canal, the materials for a review of which are afforded by an article written by Florence Whitbeck of the University of Rochester and published in the April, 1928, issue of the magazine, *Economic Geography*.

Up to 1882, the Erie canal had cost \$79,000,000, and the tolls collected had totalled \$121,000,000, but it was then losing business to the railways. The tolls were abolished, but it continued to lose. There was successful agitation for deepening it to 9 feet, for which \$9,000,000 was appropriated in 1895. This proved ridiculously inadequate. The estimated cost had grown in 1899 to \$60,000,000, in 1901 to \$87,000,000, and in 1903, when the barge canal bill was passed by the legislature, to \$101,000,000. In a message in 1925, Governor Alfred E. Smith said: "The barge canal, including construction, terminals, grain elevators, repairs, maintenance, operation, and payment of claims for damages, has cost the people since 1905, \$191,626,000; from 1905, when first canal bonds were sold up to 1924 inclusive we have paid in interest \$39,880,387, making total cost of the barge canal to date \$230,881,000." He estimated that a further expenditure of \$16,606,000 was needed, and said there were still pending claims against the state for damage to water rights, etc., amounting to a total of \$23,892,473.

This experience was not entirely exceptional. The estimated and actual costs of various large canals in different parts of the world have been as follows: Suez, estimated cost, \$30,000,000; actual cost, \$80,000,000; Manchester ship canal, estimated cost, \$40,000,000, actual cost, \$83,000,000; Panama canal, estimated cost, \$140,000,000; actual cost, \$375,000,000; Chicago drainage canal, estimated cost, \$16,000,000, actual cost, \$53,000,000. Current estimates of the cost of waterway development probably are equally reliable.

### Traffic One-Tenth of Estimate

The advocates of deepening and improving the Erie canal estimated that the tonnage carried on it would quickly rise to 20,000,000 tons per year. The improved canal was officially opened in 1918. The traffic carried on it annually in the eight years ending with 1925 averaged 2,000,000 tons annually, or one-tenth of the estimate, and in 1925 was 3,200,000 tons.

One of the principal grounds upon which deepening of the canal was advocated was that its competition would compel large reductions of the rates of the com-



peting railways. The canal convention at Buffalo in 1901 referred to the waterways of the state "as the only safeguards for our people against such excessive railroad rates and discriminations, and as regulators of all through and local railroad rates in our state." In 1902 Governor Seymour wrote, "If they do not carry a pound of freight it might be wise to keep them in order so that they would be ready for use to defeat unjust and hurtful charges against the business of New York." It might reasonably have been expected that after state commissions and the Interstate Commerce Commission had begun effectively to regulate railway rates the advocacy of inland waterways to regulate them would stop. As recently as 1911, however, the Barge Canal Terminal Commission of New York made this remarkable statement: "It is our firm conviction that the reduction in freight rates that will be forced upon the railroads paralleling the canals, and which carry fully 50 times as much today as the canals carry in the matter of freight, will be so large as to greatly stimulate and permanently maintain an increase in their freight traffic, will tax to the very uttermost the maximum capacity of these roads, and force the laying of additional tracks, as well as the construction of additional railroads to accommodate the traffic that will offer." It is also being said now that waterway development will not reduce, but actually increase, railway traffic. The commission's estimate of the traffic that would be carried by the canal was from 20 to 30 million tons annually. Possibly it is because the canal's traffic has amounted to only about 10 per cent of this estimate that the parallel railways have not made the reductions in their rates which it was anticipated would deluge and overwhelm them with increased freight.

It was long claimed that one principal reason why the canal did not get more traffic was that its terminals were unsatisfactory. In consequence 66 well equipped terminals were constructed. In 1924 and 1925 no freight whatever was handled at 49 of these terminals. The terminal at Albany cost \$313,000, but during the two years mentioned received only one small canal shipment (lumber) and during that time no canal freight moved in or out of its freight house.

In 1918, when it was considered necessary to utilize all available facilities of transportation to help in winning the war, the federal government put a fleet of 95 of the most modern barges on the canal at a cost of \$4,500,000. It operated them at a deficit in 1918, 1919 and 1920. It did little or nothing to stimulate traffic, and in fact it was officially declared that its entrance into the field "proved in the end to be almost a death blow to any hope of a successful traffic on the new waterway." Those who wanted it to become a carrier on the canal became equally anxious for it to retire, hoping that then private carriers would appear. It is the disappointment of this hope which has recently caused advocacy of the disposal of the canal to the United States government.

### *Transportation Costs By Rail and Canal*

The average freight rate of the railways that parallel the Erie barge canal is about 1 cent per ton mile. The average rate on the Erie canal is about  $\frac{1}{2}$  cent per ton mile. For every ton moved one mile on the canal, however, the people of New York state pay about  $3\frac{1}{2}$  cents in taxes for interest and upkeep charges, and the total average cost of moving a ton one mile on the canal is

therefore almost four times as much as the average rate paid to the competing railways.

The Erie barge canal probably has more advantages than any other inland waterway in the country, excepting the Great Lakes. Its route is from the Great Lakes to New York City, between which there moves by rail one of the largest volumes of traffic in the world. It has been given a capacity and depth sufficient for the operation of barges of large capacity and has been provided with excellent terminals. Why, then, is there transported upon it only about one-tenth of the traffic predicted before and during the time when it was being enlarged and improved? One of the principal reasons is that for five months of each year it is closed by ice. "The delays of transshipment, the slow canal boat movement, and the limited navigation season, outweigh the benefits of a slightly lower rate," said Miss Whitbeck in the article above mentioned. "In other words," she added, "we have passed out of the canal and river period in transportation. Such waterways are obsolete in the United States."

It would seem reasonable to accept this conclusion if transportation on inland waterways were to be conducted in future only by carriers provided by private capital. The situation is greatly altered when, as is now the case on the Mississippi river system, barge service is provided by the United States government and when claims are being made as to the advantages of this service which are so wild and misleading as to make the estimates as to what the Erie barge canal would cost and the traffic it would handle seem reasonable by comparison. The report of the Inland Waterways Corporation for 1926 indicates that in that year about 6,000,000 bushels of grain were handled by its barge line at a rate of  $6\frac{1}{2}$  cents a bushel less than the all-rail rate from Kansas City or Omaha to New Orleans. These figures would indicate that if the farmers got the entire benefits of the difference between the rail and water rates the advantage derived by them did not exceed \$390,000. What the report of the Inland Waterways Corporation actually implied was that the lower rate made by it "resulted not only in the farmer whose grain was shipped by the barge line receiving from  $2\frac{1}{2}$  to 3 cents per bushel more for his grain, but that the transportation price so set by this governmental transportation agency was reflected in a correspondingly increased price to the farmer on all of the \$300,000,000 bushels of grain exported last year from the middle west, so that the farmers received at least \$5,500,000 more in money for their grain than they otherwise would have received." By what legerdemain of mathematics or economics a saving in freight rates on a small amount of grain was converted into an increase in the price of fifty times as much grain and into an advantage to the farmers 15 to 30 times as great as the saving in freight rates is inexplicable to anybody except a waterway enthusiast.

The claim made is so preposterous that it would be unworthy of notice excepting that it illustrates the kind of claims that always have been advanced in support of the development of inland waterways, which the public seems eager to accept, and which must be refuted if the government is to be prevented from adopting a transportation policy which would be highly injurious to the railways and cause enormous losses to the public.

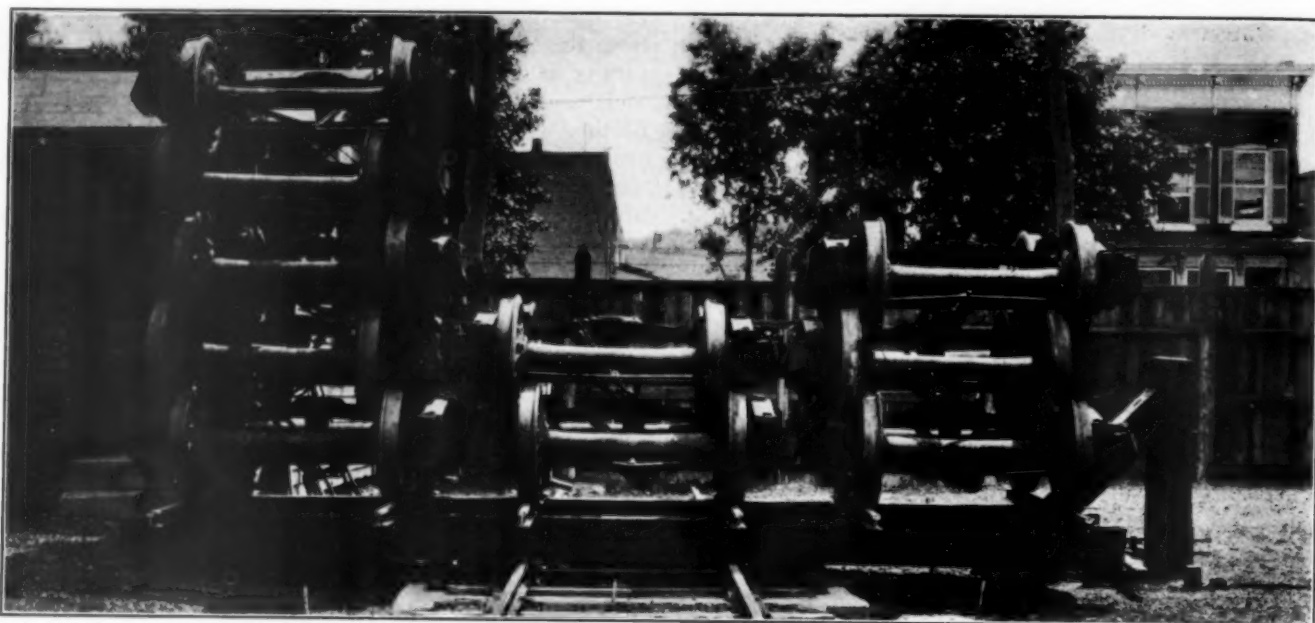
# Tests to Determine Truck Action

*Static effects of warped track surface in causing derailments under varying truck conditions are measured*

A SERIES of tests to determine accurately certain phases of freight truck action was conducted on the research plant built by T. H. Symington & Son, Inc., Baltimore, Md., at the South Baltimore works of the Standard Steel Car Company, Curtis Bay, Baltimore, October 1 to 5, inclusive. The plant, a description of which appeared in the September 22, 1928, issue of the *Railway Age*, consists of specially prepared track on which various conditions of track warp may be created and accurately controlled and also includes a specially designed turntable for use in measuring the flange pressure necessary to turn trucks under the car body with the car standing on track the surface of which may be either level or warped by varying amounts.

The tests, which were witnessed by representatives of fourteen railroads, were confined to the determination of the amount of depression or super-elevation in the out-

and standard flexible truck with standard bolster equipped with the Barber lateral motion device. The tests were made by slowly moving the car over the prepared section of track and stopping it at the point where the tread of one of the wheels on the outside rail of the curve had raised approximately  $\frac{3}{8}$  in. (determined by feeler gage) from the top of the rail. In all derailment tests, both on warped track resulting from super-elevation of the outside rail and from depression of the outside rail, a lateral slippage of the wheel treads on the rail is always noted before the wheel lifts, the flange of the wheel tending to climb slightly and then drop back into place as a result of this lateral slippage. It is thus evident that a variation in the condition of the rail surface will affect the amount of track warp necessary to cause derailment. In order that this condition might not affect the uniformity of the results, the tests were all made with



Test of Turntable with a Load of 86,300 lbs. Unequally Distributed on the Two Rails

side rails of curves, measured in terms of track warp in a distance equal to that between the truck centers, required to cause derailment of a box car of rigid body construction which had a total weight of 82,000 lb., and to the determination of the turning resistance of trucks under various conditions.

## Derailments From Track Warp

The derailment tests were made with research car No. 2 which, as described in the previous article already referred to, is equipped with six water tanks in each end to provide for various conditions of loading. In the derailment tests, the car was used without loading other than the 18 tons weight of the tanks themselves, making a gross load of 82,000 lb. The distance between truck centers is 31 ft.  $\frac{1}{2}$  in. Tests were made under three truck conditions: Standard rigid truck with standard bolster;

a dry, sanded rail. Had the rail been greased or wet, the amount of depression or elevation of the outer rail to cause derailment would have been greater than that recorded in these tests. Greater flexibility in the car body, or a decrease in side bearing spread would also increase the amount of warp required to cause derailment.

## Depressed Outer Rail

With one exception, all of the tests were made with roller side bearings. With standard rigid trucks and standard bolsters, tests were made to determine the depth of the depression, simulating a washout, in the outside rail of a 10-deg. curve, necessary to cause derailment with side bearing clearances of  $\frac{3}{8}$  in.,  $\frac{1}{4}$  in.,  $\frac{1}{8}$  in., and with no side bearing clearance. With  $\frac{3}{8}$ -in. clearance, a forward wheel of the front truck left the rail at a point where the difference in elevation of the outer rail with respect to the inner rail, in a track length equal to the



distance between the truck centers, was 3-13/16 in. With 1/4-in. side bearing clearance, derailment occurred with 2-9/16 in. depression in the outer rail; with 1/8-in. side bearing clearance, derailment occurred with 2-3/16 in. depression, and with no side bearing clearance, at 1-9/32 in. depression.

Reference has been made to the fact that, with one exception, all of these tests were made with roller side bearings. One test was made with the standard rigid trucks equipped with standard bolsters, using friction side bearings with 3/8-in. clearance. In this test, derailment occurred with 3-13/16-in. depression in the outer rail, agreeing exactly with the roller side-bearing tests with the same clearance and indicating that variations in truck turning resistance do not affect this type of derailments.

One test each was made with standard flexible trucks and standard bolsters, and with the same trucks equipped with Barber lateral motion bolsters, 1/4-in. side-bearing clearance being used in both cases. In the former case, derailment took place with a rail depression of 2 1/2-in., and, in the latter, with a rail depression of 2-7/16 in. The slight variation between these figures and the 2-9/16-in. depression at which the rigid truck equipped with the standard bolster with 1/4-in. side-bearing clearance derailed, indicates that neither of these variations in the trucks has any practical bearing on derailment caused by track warp of this kind.

#### Super-elevation of the Outer Rail

Another series of derailment tests was conducted with the same car and with the same variations in truck equipment, in which was determined the amount of super-elevation of the outside rail between truck centers on a curve of 120 ft. radius necessary to cause derailment. When equipped with rigid trucks and standard bolsters, the amounts of warp in the length of track surface between the truck centers to cause derailment of the car were as follows: With 3/8-in. side-bearing clearance, 3-5/16 in.; with 1/4-in. side-bearing clearance, 3 1/8 in.; with 1/8-in. side-bearing clearance, 2-13/16 in.; and with no side-bearing clearance, 1 1/2 in. In this case derailment occurred at the leading wheel of the trailing truck.

With flexible trucks, equipped with the standard bolster having 1/4-in. side-bearing clearance, derailment occurred with 3-1/16-in. track warp, and with the same truck equipped with the Barber lateral motion device and 1/4-in. side bearing clearance, derailment occurred with a warp of 3-7/32 in. The close agreement of the results of the three tests with 1/4-in. side-bearing clearance again indicates that neither of the two variations in the truck

structure has any practical effect on derailments caused by the conditions of track warp produced in the tests.

#### Tests of Truck-turning Resistance

The series of tests to measure the pressure at one wheel flange required to turn a freight car truck under the car body was laid out to cover a wide range of combinations of center-plate and side-bearing conditions, with track conditions varying from level to a maximum of 3 in. warp in the distance between the truck centers. The turning forces were determined by dynamometer. These tests were made with the water tanks in the car filled, the total weight of the car being 158,920 lb., of which 80,420 lb. was carried on the truck resting on the turntable.

In testing the operation of the turntable before the formal car tests were made, it was first loaded with 86,000 lb. and the resistance to turning the table itself was found to be 400 lb. when the load was uniformly distributed, and 500 lb. with 17 per cent on one rail and 83 per cent on the other. Within the month intervening between this test and the formal car tests, it was operated repeatedly without any weight on it, and it is reasonable to assume that some of the resistance was rolled out. Immediately after the formal car tests, the table was again loaded with 86,000 lb. and its resistance to turning was found to be 200 lb. with a uniformly distributed load. In view of these facts, a turning resistance of 200 lb. is assumed as most nearly representing the actual conditions during the tests, although it is recognized that it is not absolutely accurate, as some of the reduction may have taken place during the progress of the formal tests.

After the resistance of 200 lb. had been determined, the table was moved backward and forward through an angle of 10 deg. for nearly 10 min., and the resistance again measured. It then amounted to 100 lb., when the table was uniformly loaded, and 107 lb. when the load was distributed as indicated in the illustration. The figures for turning resistance measured at the flange, here recorded, are the net pressures after deducting 200 lb. from the dynamometer readings.

No tests were made with what, in the strictest sense, may be considered as greased center plates. The center plates on this car were greased approximately two months prior to the tests. Before the tests were made, the car was lifted off the trucks and graphite was spread over the bearing surface. The center plates had been machined and had run about 400 miles. Before testing with dry center plates, all caked grease and graphite was carefully scraped off the center plates.

#### Tests to Determine Truck Action—Wheel Flange Pressures to Turn the Truck under a 55-Ton Loaded Rigid-Body Car

Truck Conditions	Track Level				3/4-in. Track Warp				1 1/2-in. Track Warp				2 1/4-in. Track Warp				3-in. Track Warp			
	Side-Bearing Clearance				Side-Bearing Clearance				Side-Bearing Clearance				Side-Bearing Clearance				Side-Bearing Clearance			
	0 in.	1/8 in.	1/4 in.	3/8 in.	0 in.	1/8 in.	1/4 in.	3/8 in.	0 in.	1/8 in.	1/4 in.	3/8 in.	0 in.	1/8 in.	1/4 in.	3/8 in.	0 in.	1/8 in.	1/4 in.	3/8 in.
Dry center plate roller side bearing.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,620	850	.....	.....	2,250	1,550	570*	.....	2,460	2,250	1,720
																780*				
Dry center plate roller side bearing cocked or prevented from moving.....	.....	.....	.....	.....	.....	1,410	.....	.....	.....	2,075	.....	.....	.....	3,230	.....	.....	.....	3,510	.....	.....
Greased center-plate friction side bearing....	600	640	.....	1,000	4,700	1,025	.....	1,000	11,175	4,910	1,410	1,400	15,900	13,940	4,640	1,800	19,050	20,870	12,330	2,700
Greased center-plate roller side bearing....	570	.....	.....	.....	1,550	500	.....	.....	3,020	1,690	.....	.....	4,510	2,810	1,340	850	5,820	4,350	3,720	1,130

\* These readings are incorrect because of a faulty dynamometer connection.

The results of the tests are shown in the table. They indicate that center plate resistance is not the major factor in the resistance to turning which must be overcome by rail pressure at the flange, under the truck conditions prevailing when such turning is normally required. The flange pressure required to turn the truck on level track ranges approximately from 600 to 1,000 lb., with center plates greased. Forces greater than these are the result of side-bearing friction, or under certain conditions, a combination of side-bearing friction and additional center-plate friction caused by the tilting of the center plate in the bearing as the side bearings on one side of the truck are brought into contact.

The results do not indicate that the presence of graphite or grease on these center bearings had any consistent influence on total truck resistance under track conditions which bring the side bearings into action. Under the high unit load on the center bearing area, it is improbable that an effective film of grease remains between the bearing surfaces more than a few hundred miles.

In these tests the roller side bearings effected a reduction in total resistance to truck turning carrying from two-thirds to four-fifths. It should be pointed out, however, that the friction side bearings had never been in service and had not worn down to a bearing. This may have resulted in higher resistances during the tests than would have been found with well worn side-bearing surfaces.

The tests at Baltimore were all made under static conditions. Further tests in which graphic records will be made of the dynamic effects produced while the cars are in motion, will be made in road service.

## Freight Car Loading

WASHINGTON, D. C.

**R**EVENUE freight car loading during the week ended October 13 amounted to 1,190,127 cars, an increase of 3,529 cars over the preceding week and of 70,120 cars as compared with the corresponding week of last year. Comparison with the corresponding week of 1926 shows a decrease of 12,653

cars. Only loading of live stock showed a decrease as compared with freight loaded a year ago and loading in all districts was larger than last year. The summary, as compiled by the Car Service Division of the American Railway Association follows:

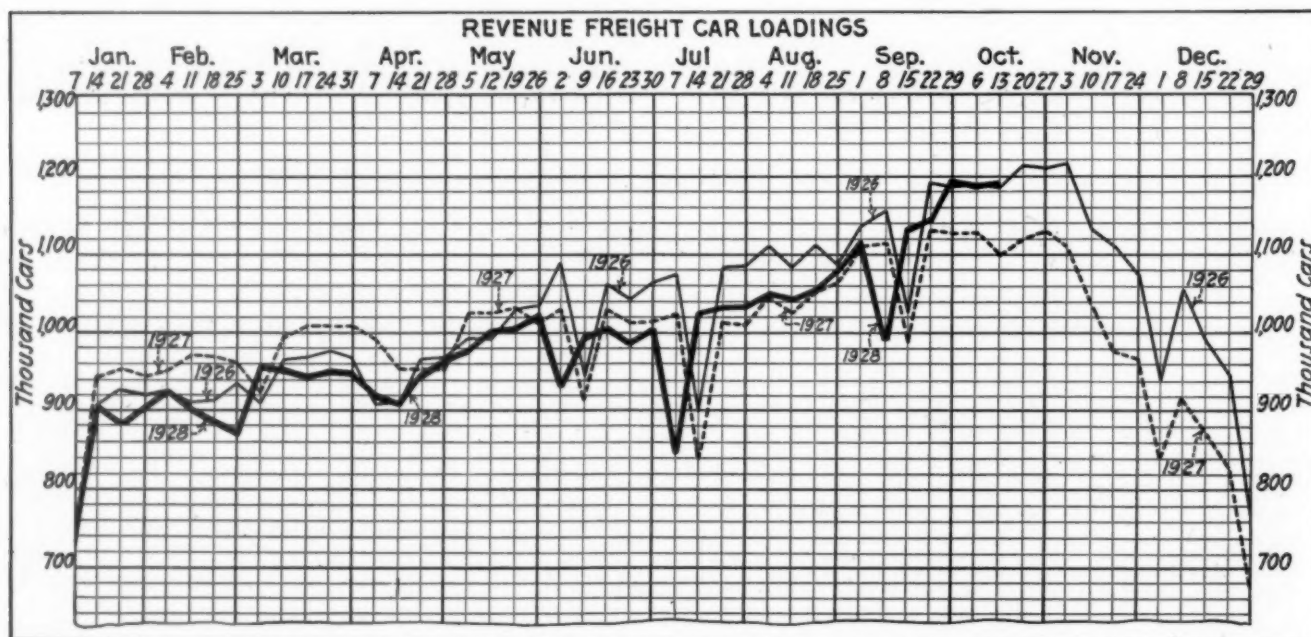
Revenue Freight Car Loading			
Week Ended Saturday, October 13, 1928			
Districts	1928	1927	1926
Eastern .....	264,309	239,900	266,439
Allegheny .....	236,687	214,990	241,482
Pocahontas .....	65,766	59,496	62,549
Southern .....	165,198	161,231	170,281
Northwestern .....	179,009	173,856	187,574
Central Western .....	181,465	180,689	181,332
Southwestern .....	97,693	89,845	93,123
Total Western Districts .....	458,167	444,390	462,029
Total All Roads .....	1,190,127	1,120,007	1,202,780
Commodities			
Grain and Grain Products .....	56,784	52,416	52,487
Live Stock .....	38,389	40,772	40,751
Coal .....	207,940	196,508	222,920
Coke .....	10,991	9,652	13,011
Forest Products .....	66,966	66,484	72,643
Ore .....	60,690	52,065	69,136
Merchandise L.C.L. ....	269,354	268,544	270,276
Miscellaneous .....	479,013	433,566	461,556
October 13 .....	1,190,127	1,120,007	1,202,780
October 6 .....	1,186,598	1,102,994	1,174,928
September 29 .....	1,196,768	1,126,903	1,180,049
September 22 .....	1,143,214	1,126,402	1,175,407
September 15 .....	1,138,312	1,127,643	1,179,259
Cumulative total, 41 weeks .....	40,593,854	41,395,755	41,950,337

The freight car surplus during the period ended October 8 averaged 92,203 cars, as compared with 103,906 cars on September 30. The total included 47,551 box cars, 17,728 coal cars, 12,585 stock cars and 6,365 refrigerator cars.

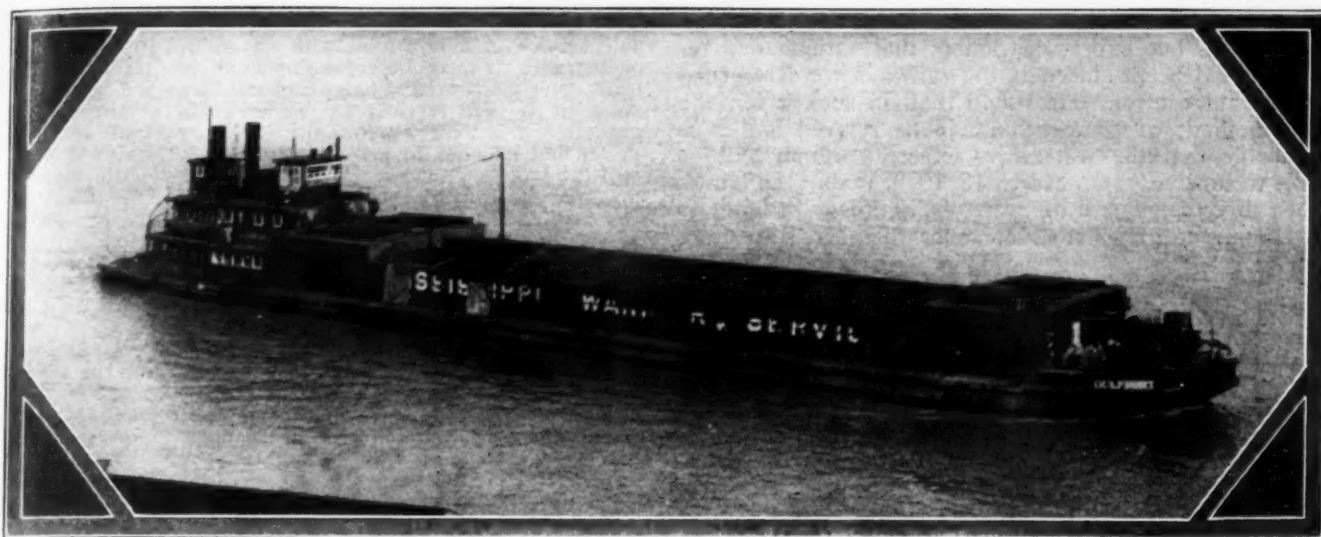
### Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended October 13 totalled 92,121 cars, an increase over the previous week of 2,470 cars and an increase over the same week last year of 14,949 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
Oct. 13, 1928 .....	92,121	42,800
Oct. 6, 1928 .....	89,651	42,347
Sept. 29, 1928 .....	92,387	43,148
Oct. 15, 1927 .....	77,172	37,830
Cumulative Totals for Canada		
Oct. 13, 1928 .....	2,811,574	1,613,528
Oct. 15, 1927 .....	2,573,292	1,541,672
Oct. 16, 1926 .....	2,475,898	1,530,442







Self-Propelled Barges Supply the Fastest Service

# What the Barge Lines Are Doing

*A review of past performances and present operations  
of the Mississippi-Warrior waterways service*

## Part I

THE Denison bill, which was signed by President Coolidge on May 29, trebled the appropriation for the federal barge lines. Under the terms of this bill (H. R. 10710) an appropriation of \$10,000,000 was authorized for the Inland Waterways Corporation, which operates the barge lines. This money is to be used to continue the operation of the present lines and to extend the operations to other rivers. In view of this, it is particularly important to railway men at this time to know what is being done in the development of inland waterway transportation. The interest of the railways in this subject is by no means confined to the Mississippi valley since, by through rates, the barge lines now participate in traffic moving between points in no less than 42 states.

### History of Operations

The barge lines grew out of the activities of the Council of National Defense, organized August 29, 1916, by act of Congress. This council appointed a committee on June 15, 1917, to study the feasibility of relieving war-time traffic congestion by using navigable inland waterways. The committee rendered a report declaring that barge service could be provided at an expenditure of \$7,350,000 to carry 1,080,000 tons of freight a year and return net earnings of \$1,526,000 or 18 per cent on the investment.

In 1917, the United States Shipping Board, upon authority from the President, allotted \$3,860,000 from the funds of the Emergency Fleet Corporation, for the purchase of equipment to be used on the Mississippi river between St. Louis and St. Paul. Following this, in April, 1918, the director-general of railroads authorized the commandeering of all privately-owned floating equipment on the Mississippi and Warrior rivers, also allotting \$12,000,000 for the purchase of new floating equipment.

By the last week in September, 1918, a fleet of 30 steel

barges and 7 tow-boats had been gathered together and service established between St. Louis and New Orleans, which fleet, at the time, was reported to have a capacity of 6,000,000 ton-miles a week. In October, 1918, contracts were let for the construction of 6 additional tow-boats and 40 steel barges at a total cost of \$6,170,000. In December of the same year, 4 self-propelled steel barges were ordered.

By September, 1918, a temporary fleet, consisting of self-propelled and cargo steel barges, said to be sufficient to carry 300,000 tons of coal annually, had also been assembled for service on the Warrior river. This was supplemented, in December, 1918, by an order for 20 wooden barges costing \$6,000 each, and 3 steel tow-boats costing \$160,000 each.

The control of the barge lines was vested in an inland waterways committee of the railroad administration until August 31, 1918, from which date until March 1, 1920, the operations were in charge of the Division of Inland Waterways of the Railroad Administration. At the expiration of federal control of the rail systems, the operation of the barge lines was taken over by the Inland and Coastwise Water Service under the jurisdiction of the Secretary of War, which arrangement continued until July, 1924.

On June 3, 1924, Congress approved an act entitled, "An Act to Create the Inland Waterways Corporation for the Purpose of Carrying Out the Mandate and Purpose of Congress, as Expressed in Sections 201 and 500 of the Transportation Act, and For Other Purposes." In July, 1924, the Inland Waterways Corporation was organized in accordance with the provisions of this act and it has continued in charge of the operations to date.

### Contemporary Comment

In a letter written in December, 1918, to Frank O. Lowden, then Governor of Illinois, Director-General McAdoo expressed the wish that the barge lines prove

successful, but expressed doubts that satisfactory results could be produced if the railways were returned to private control. He stated that, in such case, "the old methods of competition will be revived and it is probable that the waterways experiment may not be able to survive." On March 12, 1919, Walker D. Hines, then director-general of railroads, addressed a letter to a committee of senators corroborating Mr. McAdoo's views.

In December, 1920, before the American Society of Mechanical Engineers, General Frank T. Hines, then chief of the Inland & Coastwise Waterways Serv-



The Facilities at Cairo, Ill., Include a Transfer for Bulk Grain from Cars to Barges

ice, as well as chief of the transportation service of the war department, expressed optimism as to the future for the barge lines. While admitting that the results attained had not been satisfactory, he expressed the belief that, given a sufficient probationary period, the barge lines would prove successful.

Somewhat similar views were held by the Chamber of Commerce of the United States in November, 1923, through a committee appointed to consider the subject. Since the report of this committee was a dominant factor in influencing the legislation which created the Inland Waterways Corporation, it is quoted in some detail:

"Operation of the government-owned barge lines on the lower Mississippi and Warrior rivers for a period of five years to determine the feasibility of such projects under private enterprise is recommended.

"This service is still being maintained for the purpose of showing the value of barge-line transportation under present-day conditions. It is the hope of the government to determine by this experiment whether and under what conditions river transportation can render a useful and profit-

able service in competition with the railroads for port-to-port traffic and, in co-ordination with the railroads, for traffic over joint rail-and-barge and rail-barge-and-rail routes. As soon as such services are shown to be practicable and profitable it is expected that the government will endeavor to sell out its lines to private carriers.

"It is too soon to decide what the results of this experiment in government operation will be. Thus far the Warrior service has been maintained at a loss. The Mississippi service has shown a deficit for most of the period of operation, but there are prospects that this service may soon prove to be definitely profitable. The experiment, however, to be of value—to be at all conclusive—must be carried on for a further period of at least five years.

"In order that Congress may be enabled more effectively and intelligently to determine its policy regarding the general improvement of navigable channels upon waterways as a means of commercial transportation, the committee recommends that the desirability be urged upon Congress of giving the Secretary of War the necessary authority and funds to operate the transportation services of the government upon the Mississippi and Warrior rivers along the lines of good commercial practice; if desirable, by the creation of a transportation corporation."

Finally, it is interesting to compare the provisions of the Denison bill with the statement regarding inland Waterways taken from the President's message to Congress on December 6, 1927:

"It has never been contemplated that if inland rivers were opened to navigation it would then be necessary for the federal government to provide the navigation. Such a request is very nearly the equivalent of a declaration that their navigation is not profitable, that the commodities which they are to carry can be taken at a cheaper rate by some other method, in which case the hundreds of millions of dollars proposed to be expended for opening rivers to navigation would be not only wasted, but would entail further constant expenditures to carry the commodities of private persons for less than cost.

"The policy is well established that the government should open public highways on land and on water, but for use of the public in their private capacity. It has put on some demonstration barge lines, but always with the expectations that if they prove profitable they will pass into private hands and if they do not prove profitable they will be withdrawn. The problems of transportation over inland waterways should be taken up by private enterprise, so that the public will have the advantage of competition in service."

#### Where Barge Lines Operate

The barge line operation is divided into three general divisions,—the Lower Mississippi division, the Warrior division and the Upper Mississippi division. The first two divisions have been in operation since 1918, while the third division was opened for service in August, 1926.

Operations are conducted throughout the year on the Mississippi river between New Orleans and St. Louis, which portion of the line constitutes the Lower Mississippi division, except between December 15 and March 15, when the port of St. Louis is closed and the

#### Schedules in Effect Between Mississippi River Points

##### Lower Mississippi River Division

Northbound						Southbound		
Express Boats		Heavy Tows		Terminal		Express Boats		Heavy Tows
6 p.m. 1st day		12 m. 1st day		Lv. New Orleans	Ar.	6 p.m. 5th day		8 a.m. 6th day
8 p.m. 2nd day		8 a.m. 3rd day		Ar. Baton Rouge	Lv.	6 a.m. 5th day		6 p.m. 5th day
6 a.m. 3rd day		8 a.m. 3rd day		Lv. Baton Rouge	Ar.	6 a.m. 6th day		6 p.m. 5th day
7 p.m. 6th day		5 a.m. 12th day		Ar. Helena	Lv.	5 a.m. 4th day		1 p.m. 3rd day
5 a.m. 7th day		5 a.m. 12th day		Lv. Helena	Ar.	5 a.m. 4th day		1 p.m. 3rd day
9 p.m. 7th day		1 p.m. 13th day		Ar. Memphis	Lv.	9 p.m. 3rd day		5 a.m. 3rd day
9 a.m. 8th day		1 p.m. 13th day		Lv. Memphis	Ar.	3 p.m. 3rd day		5 a.m. 3rd day
6 a.m. 10th day		7 a.m. 17th day		Ar. Cairo	Lv.	5 p.m. 2nd day		6 a.m. 2nd day
6 p.m. 10th day		7 a.m. 17th day		Lv. Cairo	Ar.	11 a.m. 2nd day		6 a.m. 2nd day
6 a.m. 12th day		8 a.m. 20th day		Ar. St. Louis	Lv.	3 p.m. 1st day		12 m. 1st day

##### Upper Mississippi Division

Northbound						Southbound		
				Terminal				
10 p.m. 1st day			Lv.	St. Louis	Ar.	7 p.m. 6th day		
1 p.m. 6th day			Ar.	Dubuque	Lv.	8 p.m. 3rd day		
10 p.m. 6th day			Lv.	Dubuque	Ar.	4 p.m. 3rd day		
6 p.m. 9th day			Ar.	St. Paul	Lv.	1 p.m. 1st day		
10 p.m. 9th day			Ar.	Minneapolis	Lv.	9 a.m. 1st day		



terminal at Cairo, Ill., is used instead. All-year operation is conducted on the Warrior division, which consists of a line from Birmingham, Ala., 25 miles west of Birmingham, to Mobile, via the Warrior, Tombigbee and Mobile rivers and Mobile Bay. An extension of this service, operating via Mobile bay, Mississippi sound and the Louisiana industrial canal connects Mobile and New Orleans. The Upper Mississippi division operates on the Mississippi river between St. Louis and Minneapolis and St. Paul during the season of navigation, which usually extends over about eight months each year.

The river mileage operated is as follows: Lower Mississippi division, 1,154 miles; Warrior division, 604 miles; Upper Mississippi division, 686 miles.

In addition to these facilities, the Inland Waterways Corporation owns the Warrior River Terminal Company, an Alabama corporation, operating a railway from the Warrior river at Birmingham, Ala., to Ensley, 22 miles. This is a part of what was formerly the Ensley Southern.

### Organization and Equipment

The Secretary of War, with the title of governor, is in control of the corporation. Acting in his interests, as executive head, is Major-General T. Q. Ashburn, whose title is chairman of the board, executive. In the Washington office are also the secretary-treasurer, the general counsel and an assistant to the chairman of the board. The traffic office (rates and divisions) is at New Orleans, in charge of a traffic manager, who has two assistants and two assistant general freight agents. The traffic manager of solicitation has his offices at St. Louis. Another assistant general freight agent has headquarters at Minneapolis. The operations of the three divisions are in charge of managers, located at St. Louis, Mo., Mobile, Ala., and Minneapolis, Minn. General superintendents with offices at Memphis and Minneapolis also aid in the operation of the Lower and Upper Mississippi divisions.

The freight is handled in barges which are moved in fleets by tow-boats. In addition, on the Lower Mississippi division, three self-propelled barges are operating in what is known as express packet service, which roughly corresponds to manifest freight service on a railway. The necessary transfer work at the terminal harbors is performed by tugs.

At the present time the fleet consists of 198 steel cargo barges, 17 tow-boats, 5 self-propelled barges, 7 tugboats, 12 concrete carfloats, 6 concrete oil barges, 5 concrete oil tankers, 8 derrick barges, 2 fuel floats, 5 wooden scows, 3 terminal barges, 1 pump boat and 1 motor boat. The Lower Mississippi division operates 130 units of this fleet, the Warrior division, 69 units, and the Upper Mississippi division, 71 units.

The cargo barges on the Lower Mississippi division are of two types, one with a capacity of 3,000 tons, the other 2,000 tons, based on a 9-ft. draft. On the Warrior and Upper Mississippi divisions the barges are of 500-tons capacity, based on a 6-ft. draft.

### The Terminal Situation

The terminals at various points differ widely as to size, capacity, equipment, operation and ownership. The Lower Mississippi division operates terminals at St. Louis, Mo., East St. Louis, Ill., Cairo, Memphis, Tenn., Helena, Ark., Baton Rouge, La. and New Orleans. The terminal at St. Louis is also used by the Upper Mississippi division. Until the spring of 1927 an additional terminal was operated at Vicksburg Miss., but it was

destroyed by the flood of 1927, and is now in process of reconstruction. The terminals at St. Louis, Memphis, Helena and Baton Rouge are municipally owned and leased by the barge line. The facilities at New Orleans are state-owned and those at East St. Louis and Cairo are owned by the Inland Waterways Corporation.

The Warrior division has terminals at Mobile, Ala., Tuscaloosa, Holt, and Birmingham. Municipal and state facilities are used at Mobile, the remainder of the terminals being owned by the corporation.

On the Upper Mississippi division the terminal situa-



Cranes Are Largely Used in Loading Barges at St. Louis

tion is still somewhat indefinite. A terminal, costing about \$400,000, was built by the City of Minneapolis, and turned over to the barge line in 1927. The City of St. Paul also has completed its terminal. The City of Clinton, Iowa, submitted to the voters the proposition of a bond issue for the purpose of building terminal facilities, but it was defeated. Terminals have been completed by the municipality and turned over to the barge line for use at Dubuque, Iowa, and Burlington. Terminals are also being considered by the cities of Red Wing, Minn., Davenport, Iowa., Keokuk, Rock Island, Ill., and Moline.

The rentals paid by the corporation for the state and municipally-owned-terminals vary somewhat. The principal terminal at St. Louis (Market Street) is

leased from the city at an annual rental of \$6,000. At Minneapolis, St. Paul and Dubuque the corporation has preferential rights to the terminals, for which privilege a payment of 15 cents is made for each ton of freight, exclusive of grain, passing through the terminal. The same terms and conditions apply to the terminals at Memphis, Helena, and Baton Rouge, except that no bulk grain is handled at either of these terminals.

At Cairo an annual rental of \$25 is paid to the Illinois Central for the use of an incline track. At Vicksburg the terminal facilities are situated on land owned by the city for which an annual rental of \$1,000 is paid.

At New Orleans, the corporation uses the docks controlled by the board of commissioners of the Port of New Orleans and pays the regular published tariff rate for these facilities. The city and state-owned facilities at Mobile are used under the regular tariff rate, as provided in the tariffs of the Dock Board of Mobile. The facilities at Holt, Ala., belonging to the corporation, are situated on land belonging to the Central Coal & Iron Company, and an annual rental of \$300 is paid. The operation of these terminals cost \$2,117,715 in 1927 and represented one of the largest single items of expense.

Cranes of various types, both movable and stationary, are used in transferring the freight from the docks to the barges at practically all the terminals. A large gantry crane installation, supplemented by movable cranes operated along a dock-side track, is in operation at St. Louis. At this point freight arriving by rail is spotted alongside the freight house platform and hauled to dockside, after it has been classified, by both hand and electric trucks and trailers. Some of the trucks are equipped with detachable bodies, so that they may be lifted into the barge, the freight removed and the empty truck body returned to the dock. An adaptation of the veri-check system of freight handling is in use at this station. Among the other facilities is a grain transfer for trans-shipping grain from the small upper river barges to the larger ones used on the lower river. A floating terminal has been installed at East St. Louis, which is reached by a track across an adjustable cradle to meet the fluctuating stages of the river. The Cairo, Ill., terminal is equipped with a grain transfer facility which is used largely when the St. Louis port is closed.

At Memphis the situation is more complex. The steep bluffs, which form the river front there, make it necessary to have what amounts to duplicate facilities. The freight from the barges is unloaded at a floating terminal at water level. An escalator then carries it up the bluff to a freight platform at the top, where it is transferred into cars and hauled by switching locomotives owned by the corporation to the yard at the Union Railway, where interchange is made with the railways entering Memphis. A similar procedure is followed in the reverse direction on traffic from the railways to the barge line.

The activities at the New Orleans terminal extend over practically the entire harbor. In addition to the dock at Bienville street, in the downtown section, three other terminals are maintained in New Orleans and across the river at Algiers, including a sugar-handling dock. A sizeable percentage of the traffic passing through this port is also trans-shipped directly from barges to ocean-going vessels and vice versa.

#### Schedules

There are two classes of service on the Lower Mississippi. Heavy freight is loaded into the large cargo barges, which are grouped into fleets and handled by

tow-boats, while package freight and other traffic requiring somewhat prompter movement is handled in the self-propelled barges, which operate singly in what is known as express service. The schedule for the express service, as shown in the accompanying table, provides for twelfth-morning delivery at St. Louis from New Orleans and sixth-evening delivery in the opposite direction. This compares with railway manifest service of third-noon delivery by the railways in each direction. The heavy-tow service provides for sixteenth or seventeenth-morning delivery at St. Louis from New Orleans and sixth-morning delivery in the reverse direction. The railways handle such freight for fourth-noon delivery in both directions. Ninth-evening delivery is provided in Minneapolis from St. Louis, with sixth-evening delivery in the reverse direction. This compares with third-morning delivery in both directions, provided by the railways. Express tows, consisting of a towboat and three or four barges, are also operated, scheduled to make the round trip between St. Louis and New Orleans in 23 days.

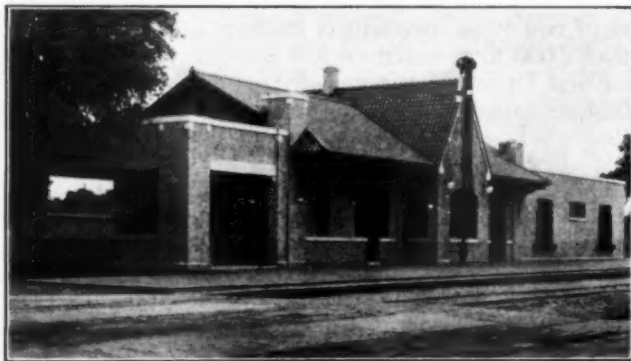
#### River Operations

The crew of each tow-boat averages 31 men on the Lower Mississippi division, 19 men on the Upper Mississippi division and 20 on the Warrior division. The officers include a master, two pilots, a chief engineer, two assistant chief engineers and a radio operator. When the service was begun it was extremely difficult to secure a sufficient number of trained men to operate the boats. However, as the service has grown, a competent personnel has been built up, although the securing of trained men still presents some difficulties upon occasion. In order to encourage the present staff of officers, a bonus is paid to each officer who works six months continuously without a lay-off other than the regular lay-over period between boats. The deck-hands and other common labor are recruited from the negro population.

The personnel of the boats, as well as their movement, is in charge of a general superintendent at Memphis. He also has charge of the central wireless station at that point. Each boat is equipped with a wireless outfit in charge of a competent operator, by means of which reports are sent from each boat to the central office at Memphis every three hours, so that the general superintendent is in close touch with their movement and can issue any necessary instructions. This also serves as a means of advising shippers as to the location of their shipments while enroute. A similar central wireless office is situated at Minneapolis and governs the operation of the Upper Mississippi division.

Part II of this article, describing traffic conditions and financial results, will appear in an early issue.

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New Combination Station of the M.-K.-T. at Dublin, Texas



# Manufacturers Hold Transportation Session

*Association hears addresses and committee report favoring rail and highway co-ordination*

THE National Association of Manufacturers held its annual meeting at the Waldorf-Astoria Hotel, New York, on October 22-24 on which occasion a number of addresses of business leaders were delivered. The association's transportation committee also presented its report in which it favored air, highway and railway co-ordination and refused to take a stand on the question of waterways development. The report of this committee, in abstract, was as follows:

## **Co-ordination Necessary**

The public interest requires that the functions of transportation agencies, such as railroads, motor vehicles on the highways, carriers by water and airplanes be, as far as possible, co-ordinated and made supplementary to one another and that unnecessary and destructive competition between them be avoided.

## **Protecting the Public Right**

The public's right to the selection of the agency of transportation which it finds most useful for a particular service should be protected, but in cases where there is competition, the terms of competition, so far as influenced by public authority should be fair and nothing done which will impair or destroy existing agencies essential to the commerce of the people. No special privilege or special protection should be granted to any private interests but our public policy should be to improve transportation not impair or destroy it.

## **Aviation**

In the matter of aviation, it is stated on the part of responsible governmental authority that the United States has become the leader of the world in aviation development. During the past two years, particularly, the federal government through appropriations to the Army and Navy, the Post Office through expansion of air mail service, and the Department of Commerce, have done much to encourage and stimulate this form of transportation. At the same time, private interests have been very active in developing aviation for commercial ends, all with the result that to-day the United States has better aviation equipment than any other country in the world, and in the establishment of airports in all of our important centers, as well as many minor ones, has progressed with great rapidity.

## **Air and Rail Mail Co-ordination**

Co-ordination with rail transportation has been recently developed in the case of trans-continental passenger and mail traffic, through the efforts primarily of the Pennsylvania Railroad and Colonel Lindbergh and associates, and subsequently by other railways.

This rapid development in commercial aviation is destined to become vast in years to come, and will lend great force to and become an important factor in the national defense.

Greater speed, or time saving, is the principal factor in the development of commercial aviation, as has been the case heretofore in rail and motor transportation.

## **Motor Transportation**

As stated last year, the National Association of Manufacturers is concerned principally with questions of policy bearing on sound economics and a satisfactory co-ordination with other forms of transportation.

Motor transportation continues its extensive development, under the encouragement of fair opportunity and a large field for its use.

Regulation and taxation are the factors in which the Association in the light of its platform is principally concerned.

Your Committee regards with interest and directs attention

to the need of greater and more intimate co-ordination of rail and motor transportation. This need is felt particularly at large and congested terminals and if motor transportation could be developed so as to provide door to door delivery from rail carriers under the management of the latter, with charges to include both rail and motor movement, it would, it is believed, be a distinct advantage to both rail carrier and the public.

In line with this your Committee regards with great favor the proposal now under consideration whereby the railroads of the country will take over the ownership and management of the railway express business.

Your Committee recommends to the Board that the Association take such action as in its judgment seems appropriate, and within its power to promote this closer co-ordination of rail, truck and bus transportation.

## **Rail Transportation**

While railroad traffic growth has developed through cycles of peaks and valleys often showing wide variations, yet because of the more stabilized and fuller development of the country in all directions as a whole together with limited immigration and expanding highway transportation, its rate of growth in the future should be less than in the earlier development period.

Reduction in rates has been made possible by improved efficiency of management and the expenditures of \$5,163,000,000 in capital.

Based on the tentative valuation of the Interstate Commerce Commission the average return since 1922 has been 4.66 per cent, with a maximum in one year of 5½ per cent. Inasmuch as an average return of 5¾ per cent on a fair valuation is regarded by the law as a reasonable average return, it is possible to judge whether or not the railroads have received their fair return. It cannot be said that they have, particularly in the case of the western group, which serves agricultural territory principally.

Under government regulation if the net earnings exceed 5¾ per cent in any one year, the recapture clause of the Transportation Act becomes operative and the government takes one-half of the excess and requires the other half to be set aside for necessary capital expenditures.

## **Recapture on an Average Basis**

Your Committee has called your attention to the fact that the recapture clause of the law applies on each single year of operation, and has suggested that in fairness it should operate on an average of several years, and a three-year average was proposed, but in view of the experience of the past six years the Committee recommends that the average of the recapture clause might well be based on the average of five years instead of three. If railroad rates were adjusted to such a level as the law contemplates, such an amendment and regulation would, it is thought, become a considerable factor as a stabilizing influence in employment of labor, capital, railroad securities and business in general.

## **Watson-Parker Amendment**

Your Committee has previously called attention to the Amendment of the Transportation Act known as the Watson-Parker Amendment, affecting provisions for the settlement of labor controversies, and stated that since the enactment of the Amendment, the country has had an opportunity to observe its result. Demands for increases on the part of railway employees have been made in various sections of the country and awards, favorable to the employees, have, in most cases, been made. Your Committee feels that determined opposition should be developed to any further general wage increase, particularly in view of the fact that purchasing power of industrial wages

have been increasing rather than decreasing, and that purchasing power of wages is already 20 to 30 per cent higher than it ever was before the war.

### Purchasing Power of Railroads and Stabilization

It is generally recognized that stabilization of employment of labor and capital in all industry is a very desirable end towards which to work in the interest of the entire country. There was introduced at the last session of Congress, by Senator Jones, a measure providing for what is called a "prosperity reserve," which would authorize appropriations totaling \$150,400,000 for public works to be undertaken whenever it was found that the column, based on value of contracts for construction work in the United States had declined 10 per cent for the three-month period below the average of the corresponding three-month periods of the preceding three years; in other words, the government is concerned in mitigating the effects of widespread depression and a general period of unemployment, and the general question of alleviating unemployment is one in which our Association is naturally interested.

In this connection it may be stated that railway expenditures must have a very material effect on the stability of industry and business, and when railway earnings and purchases are not maintained, unemployment will increase, as railway expenditures naturally depend upon earnings. Therefore, the need of adequate earnings, which constitute a much larger factor in the whole economic structure than that proposed by the measure.

### Waterways

Last year your Committee made a progress report dealing with inland waterways in general, and the proposed Great Lakes-St. Lawrence waterway in particular. At the last meeting of the Committee the St. Lawrence project was discussed with the result that the Committee was divided in opinion as to whether the project was sound or not sound.

The Committee submits the above annual report to the membership without detailed reference to waterways development. That portion of our study dealing with waterways and containing statements by the proponents and opponents of the project will be submitted to the Board of Directors for its consideration, as it is not within the province of any committee to establish policy position of the Association independent of the Board of Directors' authorization.

The report was submitted as a matter of record, its main points being summarized in an address by S. P. Bush of the American Rolling Mill Company, chairman of the Association's transportation committee.

Following Mr. Bush, the next speaker on the program was L. C. Bell of the W. M. Ritter Lumber Company, Columbus, O., who made an address critical of the Interstate Commerce Commission's action in the lake cargo coal case.

### Necessity of a Fair Return

C. R. Burnett of the American Oil & Supply Co., Newark, N. J., told of the dependence of the nation on the service of the railways and added:

"The one great essential necessary to bring about this result was credit. This, in turn, was based on the confidence of the people in the management of our railroads and the assurance that they would be able to earn sufficient profits to pay investors for the use of their savings and at the same time enable them to get their principal back intact should need or occasion require.

### Fair Return Needed if Replacements and Developments Are to Continue

"The laws of Nature cannot be violated without penalty. As sure as two and two make four unless the railways can make a fair return upon capital invested the reservoirs for extension, replacements and new development will be dried up. Let the farmer in the country and the artisan, clerk and dweller in the city watch the labor world to see that it does not get unfair advantages in the way of compensation; the political world to see that manipulators and place seekers do not

exploit for selfish ends and the financial world to see that it does not bring about government ownership and operation."

### Danger to All Industry In Attitude Toward Railroads

"There is no fact of present economic importance more remarkable or inexplicable than the attitude of the public, of most public men, and even of many business men, toward the problem of making and keeping the railroads a prosperous industry," said Samuel O. Dunn, editor of the *Railway Age*, in his address.

"This attitude is strikingly illustrated in the present national political campaign. Our three greatest industries are agriculture, manufacturing and transportation. There is rivalry between the two great political parties in trying to convince the public that each of them will do more than the other to increase the prosperity of the farmers. They both claim to favor policies that will be helpful, or, at least, not harmful, to the manufacturing industry. On the other hand, some public men are advocating reductions of the rates of the railways; some are advocating government action to increase competition with them; but there has been no important declaration in favor of any policy designed to increase or even maintain the prosperity of the great railroad industry, upon whose efficient functioning the prosperity of all other industries so largely depends.

### Competition Hurts Equipment Manufacturers

"Is this because the railroad situation is so good that no concern need be expressed about it and no policy adopted to assure the expansion and improvement of the railways? Partly because of losses of traffic to other means of transportation the railways have bought an almost unprecedentedly small amount of new equipment within the last two years, and the railway equipment manufacturing industry, which depends upon the railways for a market, had a bad year in 1927, and a decline of 30 percent in its net profits in the first half of 1928. Owing to a sharp increase in freight business within recent weeks we have come closer to having shortages of various kinds of freight cars this fall than at any time within five years. The railways are now employing fewer men than at any time since 1922. What is the explanation of all this? It is to be found principally in the fact that the average return earned by the railways upon their investment in 1927 was the smallest since 1922, and thus far this year has been smaller than last year.

### Political Rate Making

"Prospects are that for some months to come, the net earnings of the railways will show increases, provided there are no large advances in wages or reductions of rates. There is, however, constant pressure for both advances in wages and reductions of rates. When Congress meets the demand will be renewed for legislation to abolish the passenger surcharge, which would be direct rate-making by Congress and would deprive the railways of \$40,000,000 of revenues. There is constant pressure for reductions of freight rates, especially on farm products. Railway securities are now selling at comparatively high prices, although the advance in their prices has been small as compared with the general advance in the prices of industrial and public utility securities. For five years railway freight service has been unprecedentedly good. But present conditions, whether favorable or unfavorable, are not the only things to be considered. Prevailing tendencies are always quite



as important as present conditions, because prevailing tendencies, unless changed, will determine future conditions. For a long time prevailing tendencies have been adverse to the prosperity of the railroad industry, and unless the public, public men and business men recognize the fact that prosperity in the railroad industry is as conducive to the public welfare as prosperity in any other industry, and in consequence these tendencies are changed, the results will be very harmful.

#### A Warning to Other Industries

"The courts repeatedly have held that the railways are entitled to a fair return upon the value of their properties, and this principle has been embodied in the Transportation Act. But in actual practice it is being ignored. As the laws have been administered the railways have not been allowed to earn a fair return and are nowhere near earning it now. The precedent being set by the government by its regulation of railway profits, and so generally acquiesced in by men in most lines of business, undoubtedly is in some measure responsible for an announcement recently made by Senator Smith W. Brookhart of Iowa. This is that he will introduce a bill in Congress for the limitation of the profits of all industries.

"Business men who see no harm in the government's policy of regulating the profits of the railways and limiting them to less than a fair return, may well consider whether they would like to have that policy applied to other industries. It may be said that limitation of the profits of other industries would be unconstitutional. But the constitution can be changed. It may be said it would be impracticable. It would be as practicable as limitation of the profits of railroads. It may be said it would introduce too much 'government in business.'" Why so much fear of government in other kinds of business and so little fear of government in the transportation business? It may be said it would hinder the progress of other industries. It would not hinder their progress any more than it hinders the progress of the railroads.

#### Profit Regulation Policy Developing

"The government's policy of regulating railroads already is developing into a policy of regulating profits in other industries. This was the very purpose of the authors of the Hoch-Smith resolution. That resolution directs the Interstate Commerce Commission, in adjusting freight rates, to consider the conditions in the various industries, which means that industries that are depressed are to be given lower freight rates, and those that are prosperous are to be made to pay higher freight rates if needed to compensate the railways for the reductions given those that are depressed. This, of course, is regulation of freight rates for the purpose of regulating profits in the various industries."

#### Railway Prosperity and Other Business

E. B. Leigh, president of the Chicago Railway Equipment Company, said that many men not identified with the railway supply industry show a deep interest in the welfare of the railways not merely because of their dependence upon good service economically rendered, but because of their conviction that when the railways are making normal expenditures upon their properties general business is good.

"Three questions," said Mr. Leigh, "seem in order as to the period in which we now are. First are railway outlays sub-normal? Second, is there, like the Allies'

contracts of 1915 and following any extraordinary factor capable of sustaining general business during a term of sub-normal railway expenditure? Third, has general business in fact been and is it now sustained at a normal rate of growth?

#### Reduced Inventories

"We are in transition. Conditions have changed more rapidly than there is any reason to expect they will in the future. An item which may never be repeated in anything like the same degree is the reduction in railway inventories. When a railroad draws for a time on its supplies on hand without currently buying more it is doing its work but it is not sustaining general business through purchases from industry.

"That is what has been going on and on a large scale. It is said that many roads have reduced inventory 50 per cent and not a few, including some very large lines, more than 50 per cent. The railways, as a whole, got inventory down 30 per cent at the end of 1925 as compared with 1920, the peak. With the growth of the country and of railway plant the amount of inventory has again turned up in 1926 and increased further in 1927. In this series of years, then, no matter how normal the traffic handled or how excellent the job done by the roads they have as to important factors in operating cost been living, more or less, on their fat.

"Next we are to inquire whether a purchasing power analogous to the Allies' contracts in 1915 has come into the market, taking the place of normal railway purchases in sustaining general business. Obviously we have such a stimulus in the production of automobiles.

"Another extraordinary purchasing and employing power of the first magnitude effective just now is in the building construction industry. From an index of 64 in 1919 building construction rose to 95 in 1924, to 122 in 1925, 129 in 1926 and 163 in 1928.

#### Politics Not a Factor

"It will hardly be contented that domestic political uncertainty has shown itself as a deterrent to business and, indeed recovery of strength in our foreign markets is demonstrated by the efforts of the whole world to organize for resistance to the American export peril. There will be differences of opinion as to the recent and present influence of agricultural conditions upon consumption of general commodities by the farmers.

"At least this much we know; in due course the railways will have taken up all the slack they can in inventory and in efficient use of facilities. Volume of traffic will have developed through the natural growth of population and higher standards of living among consumers. Expenditures on railway property will average relatively greater than at present."

#### Railways Must Be Stabilized

Frank W. Noxon, secretary of the Railway Business Association, in his address declared that the railways' earnings are seriously unstabilized, directly and indirectly, through depressions in construction work, and that this fact appears to be but incompletely realized even by many who are directly and seriously affected. "When construction sags, down goes railway traffic. Construction materials move in smaller volume. Postponement or cancellation of manufacturers' orders for machinery and supplies occasions further decline in railway freight.

#### Railways' Part in Construction

"One of the largest items in what the Senate committee calls 'construction' is railway construction. There

is perhaps nobody whose work on plant, if planned with a view to preventing slumps in railway earnings, would exert so much influence as the railways themselves.

"What part do they play in the national total of the work on plant which the Senate committee recognizes as basic in the ups and downs of general industry and business? By "construction" those urging the Jones bill have in mind particularly the erection and enlargement of buildings and other structures in which, or upon which, business activity, either private or governmental, is to be carried on. That is, work which is preparatory for production or service; work which represents enlargement of the country's plant. Statistics measuring the volume of such work are derived from reports of contracts. Under the Jones bill what the President would communicate to Congress in time of depression would be "the volume, based upon value, of contracts awarded for construction work." Doubtless the President would obtain the data from the Department of Commerce, which would probably use the F. W. Dodge reports qualified by some other data. The Dodge reports are said to cover 90 per cent of the country's construction business. For the last three years the Dodge figures show an annual average of not quite six and three quarters billions.

"In the same period, what did the railways expend upon plant? For present purposes there is of course no valid distinction between maintenance charged to operating expenses and additions and betterments charged to capital account. Both show use of material and equipment, involving the direct and indirect employment of men, and flushing all the channels of miscellaneous industry and business with activity which produces railway freight and passenger earnings. For the same three years the railways' capital and maintenance of way expenditures averaged very nearly three billions, compared with less than six and three quarters billions in the general construction contracts. Work on railway plant, in other words, was more than 40 per cent as great, or to be exact, 43.5 per cent as great, as the work on plant in general, the stabilization of which has won solicitude at Washington as already set forth.

"The only course which may properly be advocated is the systematic endeavor so to plan capital and maintenance projects that such work will habitually tend toward general stability."

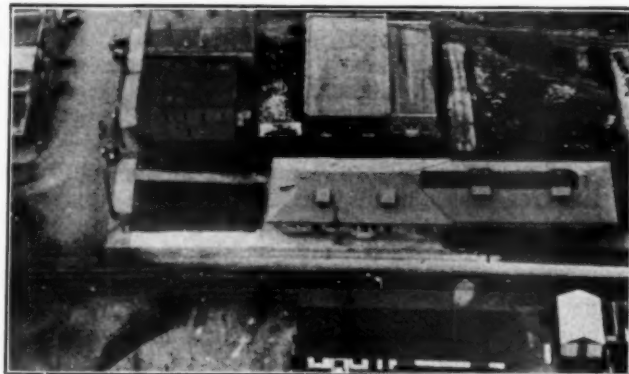
### Favors St. Lawrence Waterway

Adolph Mueller, of Decatur, Ill., delivered an address advocating the St. Lawrence deep waterway project. Among other things, he said:

"The railroad rate on grain from Chicago to New York is 13½ cents plus one cent per bushel for transfer charges, and the lowest known ocean rate to Liverpool is 5.25 cents, or a total of 19.75 cents. The rate by water from Chicago to New York is 8.79 plus the ocean rate of 5.25, makes a total of 14.04 cents per bushel, a saving of 5.71 cents per bushel. A like proportionate saving will be assured to all other exports and imports by waterways and ocean vessels. The St. Lawrence Deep Waterway surely would give a lower rate than the water rate from Chicago by Lake and Canal to New York, and no doubt would be nearer the ocean rate from New York to Liverpool, to wit: 5.25 cents or a through rate from Chicago to Liverpool via the St. Lawrence Deep Waterway and the ocean of probably less than 10 cents per bushel, a saving of approximately 50 percent to the shipper."

## Atlanta & West Point "Air-Marks" Its Passenger Stations

**P**RACTICAL aid to the development of aviation has been given by the Atlanta & West Point, the Western Railway of Alabama and the Georgia railroad through the "air-marking" of a number of their passenger stations between Augusta, Ga., and Selma, Ala. This "air-marking" consists of the painting of the names of the towns in which the stations are located in eight-foot letters on the station roofs. Where possible,



The "Air-Marking" of the Station at Lithonia, Ga.

the names are illuminated at night. Markings of this sort are of great value to aviators in assisting them to determine their locations while in flight.

On the Atlanta & West Point and the Western Railway of Alabama, the following stations have been marked: Fairburn, Ga., Newnan, La Grange, West Point, Opelika, Ala., Cheraw and Benton. On the Georgia railroad these stations are marked: Lithonia, Ga., Covington, Social Circle, Madison, Union Point, Camak, Harlem, Sparta and Milledgeville.

The Atlanta & West Point, the Western Railway of Alabama and the Georgia railroad are believed to be the first railways in the United States to so mark the towns along their routes. The names of the stations were painted on their roofs at the direction of Charles A. Wickersham, president and general manager of the three railroads, in August, 1927.

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New Lackawanna Y. M. C. A. at Elmira, N. Y.



# Railway Labor Act Attacked at Emergency Board Hearing

*Hearing on western wage case closes at Chicago on October  
23 and Board goes into closed session*

**F**INAL oral arguments by representatives of both the railroads and the brotherhoods were delivered to the emergency fact finding board appointed by President Coolidge to investigate the conductors and trainmen's wage controversy in the West on October 22, marking the close of the hearings which have been in progress at Chicago since October 2. James R. Garfield, chairman of the board, announced on October 24, that after two days of closed sessions the Board had completed its deliberations upon the evidence presented by the railroads and the employees. Members of the Board left Chicago on that day and Mr. Garfield indicated that the Board's report would be immediately presented to President Coolidge.

E. P. Curtis, president of the Order of Railway Conductors, and A. F. Whitney, president of the Brotherhood of Railroad Trainmen, made statements for the employees while J. Carter Fort, assistant to the general counsel of the Illinois Central, and Kenneth F. Burgess, general solicitor of the Chicago, Burlington & Quincy, spoke for the carriers.

Mr. Curtis mentioned four points of difference on which he said the board had received evidence: The attitude of both parties toward the Railway Labor Act and its mediation and arbitration provisions, the wage increases, the conversion or pick-up and drop rule, on lines where no such rule now appears in the agreements, and the carriers demand for double-header rule modification. He expressed the belief that the employees are entitled to a greater increase in wages than the 7.5 per cent that they are requesting and called attention to the fact that it would require a 26.5 per cent increase to place the conductors and trainmen in the same relative wage position as the firemen. The automatic scale of wages of enginemen and firemen operates to make a 6.5 per cent increase to those employees a greater increase than 7.5 per cent to the trainmen, he said. Mr. Curtis cited various court decisions to the effect that employers should pay the going rate of wages regardless of their earning ability.

He addressed himself to the controversy over the double-header rule and said that the daily and weekly press had settled the matter by insisting in editorial columns that "the trainmen are arbitrarily trying to limit output", though he felt that such an attitude on the part of the public would operate more disastrously for the carriers than the employees in rate controversies.

Mr. Whitney devoted his argument to the financial ability of the carriers to pay increased wages, the increased duties and responsibilities of the trainmen and conductors, the unsoundness of measuring compensation by other than basic rates, the wages paid in industrial trades, differential rates, irregularity of employment in train service, living expenses while away from home, concessions granted by trainmen in the wage adjustment of 1924, the cost of living, wages of yardmen, the pick-up and drop rule, the hazards of double-heading and the disappearance of the "human touch" from wage negotiations since 1910. He declared that the

brotherhoods would welcome a senatorial investigation of the length of trains that can be safely handled with present air brake equipment and the hazards of double-heading. Mr. Whitney attacked, as both he and Mr. Curtis had done repeatedly throughout the hearing, the figures based up Interstate Commerce Commission statistics showing the annual average compensation of employees.

## Closing Statements for Railroads

"The present status of these negotiations is due entirely to the refusal of the employees to agree to arbitration," Mr. Fort stated in his argument. "The only conclusion that can be drawn is that the real reason for their refusal is lack of faith in their case, lack of confidence in their cause and a consequent unwillingness to submit their demands to disinterested parties.

"I do not think the record indicates that there is any real objection by the employees to double-heading on the ground of safety. The real reason is because double-heading will give the carriers an opportunity to eliminate certain unnecessary employees."

He called attention to the double-header rule on the Great Northern which allows the use of two locomotives on trains of any length as long as a given percentage of train mileage is not exceeded as a rule which serves no purpose as far as safety is concerned. In supporting the average annual compensation figures of the carriers Mr. Fort mentioned the fact that they were verified by actual earning figures produced from the Chicago divisions of the Rock Island and the Santa Fe.

Mr. Burgess concluded the argument for the railroads and devoted himself largely to the attitude taken by the brotherhoods in their refusal to arbitrate and its affect upon the smooth working of the Railway Labor Act.

"This controversy is far broader than any money which may be directly involved, so far as the conductors and trainmen are concerned, or even than may indirectly be involved in respect to other classes of railroad employees through such outcome as this dispute may have," Mr. Burgess said. "This controversy constitutes the first real test that the Railway Labor Act of 1926 has had. I had supposed that the first real test of this law would come, if it were to come, upon such an occasion as confronted the country in 1921—that is, at a time when the economic conditions of the country were such that there would be an imperative demand for a reduction in wage rates. I had never supposed that the test would come at a time when the carriers had offered a substantial increase in wages and the only dispute remaining was that the employees demanded something more as a minimum.

"The whole heart of the Railway Labor Act is the setting up of machinery sufficiently attractive to induce the parties to submit their disputes to arbitration. If it fails in that respect, then the Act fails to provide adequate protection to the public. If, then, on the other

hand, the Railway Labor Act does provide a basis for fair arbitration and the strongest labor organizations subject to its jurisdiction reject its processes, then its whole scheme has failed, and something entirely different must be set up in its stead.

#### Employees Inconsistent on Arbitration Refusal

"The Railway Labor Act, when passed by Congress, had the approval and support of the railway employees and their organizations. This approval and support extended, of course, to the principles of voluntary arbitration laid down in that act. Yet despite that approval and support in 1926, the Western conductors and trainmen have now refused to arbitrate the present dispute. This morning, Mr. Whitney, president of the Brotherhood of Railroad Trainmen, stated their present attitude toward arbitration as follows: 'If the fruits of arbitration are so great as the carriers would lead this honorable board to believe, then we submit that when that principle is applied to the fixing of prices of foodstuffs, clothing, automobiles, building materials, the salaries of railroad officials, the prices of farm products, coal, lumber and so forth, it will be sufficient time, and not until then, to suggest that the wages of railroad employees should be adjudicated by arbitration.'"

The brotherhoods on October 18 and 19, called 10 additional witnesses to present rebuttal testimony. Among them were conductors, brakemen, vice-presidents of conductors, a vice-president of trainmen, the assistant general secretary and treasurer of conductors. These men testified concerning their experience in the operation of long freight trains, the extent of double-heading in the East, as to the railroads that refused to arbitrate various wage and rule controversies prior to May 6, 1926, the regularity of employment and exercise of seniority, and as to insurance claims paid by the brotherhoods for injuries.

L. E. Sheppard, who as president of the conductors conducted the negotiations on behalf of the two train service brotherhoods in the East, South and West in 1924 and in 1927, called attention to the fact that arbitrators in previous wage negotiations had been increased along with the general increase in basic rates. He then stated that in his 27 years of experience the question of differentials had never been negotiated until 1924 when the railroads began to offer to trade rules for wage increases. The brotherhoods' position in regard to the double-header rule is, he said, that it is unfair to arbitrate things that have been accepted for a period of years when the employees have everything to lose and nothing to gain and the carriers have everything to gain and nothing to lose. Replying to an earlier suggestion by J. W. Higgins, chairman of the Conference Committee of Managers, that the men would get along better in negotiations if left alone by the brotherhood officers, Mr. Sheppard said that he had "been ordered out of town by the men as often as by the railroad companies."

In answer to Dr. Dewey's question as to the best method of settling the differences in regard to the double-header rule, Mr. Sheppard declared that the prospect of subsequent arbitration usually precludes a possibility of agreement by negotiation. Under questioning by Mr. Garfield, chairman of the board, Mr. Sheppard testified in part as follows:

Q. Then do I understand that a plan of procedure by which arbitration is at the end of the road makes more difficult a settlement between parties? A. It builds up moral cowardice. If it is an arbitration of an unknown quantity, that might be all right. Q. Then your answer would not apply to a problem of wages? A. Not

always. After a board of arbitration has intelligently handled the question, there should not be any more arbitration on that same question under the same conditions. \* \* \* Q. Then it is your opinion that in a controversy of this character regarding double-headers, that arbitration at the end of the road makes more difficult a settlement than if arbitration were not at the end? A. Yes, sir. And I am not favorable to a lot of this legislation, these adjustment boards, because it has come to pass that railroads refuse things that a few years ago they would not have thought of refusing. On the other hand, men ask for things they would not otherwise ask for. Q. Then what would be your solution of the present difficulty? A. President Roosevelt once said, "Turn them loose."

Judge Stacy questioned Mr. Sheppard on the immediate differences in controversy and declared that the employees and railroads were together in "language", though the witness said that it was a matter of principle. "We could get together," Mr. Sheppard added, "if both sides did not know that if they did not agree they could arbitrate." Mr. Garfield also asked Mr. Sheppard for a solution of the entire controversy but he replied that for certain reasons he was not at liberty to answer such a question and it was withdrawn from the record.

G. H. Warfel, assistant to the general manager of the Union Pacific, in charge of safety, was recalled as a witness on October 19 and presented an exhibit showing that in spite of the increase of length of trains from an average of 37.3 cars in 1921 to 45.5 cars in 1927, the number of casualties per million freight train miles has remained almost constant. The casualty rate increased in that period about 0.1 per cent.

J. P. McDonald, statistician for the Santa Fe, introduced an exhibit showing the accidents to road freight trainmen on that railroad in Kansas in 1928 in relation to train lengths. No fatalities had been reported to the Interstate Commerce Commission. Trains of from 1 to 10 cars numbered 1,070 for each reportable accident; from 11 to 20 cars, 729 trains per accident; from 81 to 90 cars, 1,404 trains per accident; from 121 to 130 cars, one accident; 141 to 150 cars, one accident. He testified that the alleged hazard in operating long trains is not apparent and trains having in excess of 100 cars showed fewer casualties than the shorter trains.

G. H. Von Bergen, general air brake, lubrication and car heating engineer of the Illinois Central, testified that in his 17 years of experience as a fireman and engineer and from his observations as a traveling engineer he had found no hazards in the possible confusion or misunderstanding of train signals. He declared that the A. R. A., standard K type air brake equipment when properly maintained fully meets all the present requirements of safety and good operation. The emergency application of brakes is transmitted from the locomotive to the rear car of a 100-car train in from 7 to 7-2/5 sec. and on a 125-car train in from 8-2/5 to 8-4/5 sec., and the setting of the brakes proceeds along the train in less time than it would require the cars to stop, he said. Mr. Von Bergen declared that there is no reason for any damage to occur in connection with the application of the brakes from the setting of the conductor's valve, if it is done according to air-brake rules. He concluded by saying that from 27 years of experience he knew that due to improved equipment, roadway and operating methods on the Illinois Central, regardless of the train lengths, the engine and train service employees are surrounded with a far greater degree of safety today than they were in 1901.





A Part of the Convention Group

## Bridge and Building Men Meet in Boston

*Control of motor car accidents, handling emergency work, use of motor trucks for material delivery and painting of railway buildings considered*

**N**EARLY three hundred members of the American Railway Bridge and Building Association met in the thirty-eighth annual convention of this organization at the Hotel Statler, Boston, Mass., on Oct. 23-25. The meeting was characterized by the presentation of reports of an unusually high character and by their active discussion. The reports dealt with a wide variety of problems incident to bridge and building work, including The Use of Motor Trucks for Handling Bridge and Building Supplies, The Promotion of Co-operation Between Stores Department and Field Forces, Jacking and Tunneling Culverts Through a Roadbed Under Traffic, The Control of Motor Car Accidents, Painting Railway Buildings, The Organization and Equipment for Handling Emergency Work, The Operation and Maintenance of Water Stations and The Construction and Placing of Concrete Slabs. In addition, W. T. Krausch, engineer of buildings, Chicago, Burlington & Quincy, presented a paper on The Wrecking and Salvaging of Railway Buildings. On Tuesday evening, W. J. Backes, chief engineer, Boston and Maine, and C. E. Donaldson, supervisor bridges and buildings, Central Vermont, presented illustrated addresses describing the rehabilitation work on their respective lines following the floods last fall. Part of these reports and papers are abstracted below and the remainder will appear in the next issue.

In addition, H. I. Benjamin, assistant engineer of bridges, Southern Pacific, presented a paper in which he described the manner in which the foundation conditions were investigated for a proposed structure across Suisun Bay on the San Francisco-Ogden main line. These investigations include studies of possible earthquake faults across the line of the structure and the making of borings to determine the depth of the water, the character of the material overlying the rock, the depth to rock and the nature of the rock. On account of the great tidal range and the swiftness of the current, special and unusual precautions were taken to avoid the loss of the holes and drilling machines. This structure, which will be  $1\frac{1}{8}$  miles long and on which con-

struction will begin early next year, will involve an expenditure of \$11,000,000.

### Geo. Hannauer Welcomes Association to Boston

The convention was welcomed to Boston by George Hannauer, president of the Boston & Maine, who recalled that it was 22 years since the association last held a convention in Boston. He referred to the extensive changes which have taken place within that period and outlined in an interesting manner the difficulties of the early railway builders in New England and more pointedly, the extensive problem which confronted the bridge and building men in 1927 as the result of the unprecedented flood in New England that year. Mr. Hannauer pointed out the responsibilities of the bridge and building men and paid tribute to them for the way in which they have always met emergencies.

The welcome of Mr. Hannauer was responded to, on behalf of the association, by C. E. Smith, vice-president of the N. Y., N. H., & H., and a past president of the association, who, after expressing the pleasure of the association on meeting in Boston, reviewed many of the traditions and interesting side-lights of New England, its railways, industries and its people.

The report of C. A. Lichty (C. & N. W.), secretary, showed a total membership of 755, including 57 elected during the last year.

### President Baluss Reviews Year's Work

F. C. Baluss, (office engineer, Duluth, Missabe & Northern), president of the association, presided over all sessions. Shortly after the opening of the convention, he reviewed the work of the organization during the last year. "The 37 volumes of annual proceedings constitute a reference library of the development of bridge and building practices over more than a third of a century," he said, "which no maintenance of way officer can afford to be without." Referring to the place of this organization in railway association work, Mr. Baluss spoke as follows:

"The field of the American Railway Bridge and Building Association is a distinct one, and does not

overlap or merge with any other railroad organization. There seems to be a misunderstanding in the minds of some railway officers who think there is a duplication of effort of this organization and the A. R. E. A. The men who meet here, and the matters and methods they discuss are entirely separate from those of the A. R. E. A. The latter association, within the limits of its time, cannot discuss the practical side of bridge and building work, nor does its membership include many men who are in direct charge of men performing such work. This association supplies a contact and outlet for men who are responsible for the expenditures of millions of dollars of railroad funds annually. Can there be any doubt of the resultant value they will obtain from the interchange of ideas between such men on the floor of this convention?"

## Motor Trucks for Handling Bridge and Building Material

The economies effected by the use of motor trucks in place of work trains for the distribution of bridge, building and water service materials in large terminals and other congested localities were discussed by a committee of which J. S. Huntoon, assistant bridge engineer, Michigan Central, was chairman. Figures were presented showing the direct savings effected by various roads by the use of trucks, as were also the savings effected in the

in loading and unloading, when it is expedient to increase the average load. The increased load capacity is possible because the load is distributed over more wheels and axles. Stringent legislation limiting the allowable wheel or axle loads on public highways makes the use of the trailer imperative where large loads must be hauled. Where there is a necessity of adapting the trailer to loads so awkward in shape, bulk or weight that the motor trucks cannot handle them profitably, the trailer can be designed to meet these exacting requirements. The trailer method of transporting material cannot be applied to every hauling problem. It is questionable whether it can be applied to the distribution of all bridge and building material, owing to the character of the material to be hauled, facilities for loading and varied points for delivery.

Motor truck transportation should be approved only after a scientific survey and analysis of the haulage problem has been made in each individual locality. Having a thorough knowledge of the situation, bridge and building executives should recommend the units to render efficient service at the lowest cost.

In estimating the cost of any truck installation, the first step is to decide upon the size and type of equipment. The user should know his average daily tonnage in both busy and dull seasons and the average length of haul. If this information is not available, it should be secured by the use of rented trucks so that the railroad management can determine the size and number of motor trucks required.

The accompanying table shows the daily operating costs of trucks, taking into consideration the capacity of the truck, the distance operated per day, and fixed and variable charges. The information was obtained from large trucking contractors and manufacturers, and the committee believes that the costs shown in this table are approximately correct for the vicinity of Detroit. Before determining the operating costs of any one locality each item shown in the table should be adjusted.

No allowance has been made in the table for overhead or

COST OF OPERATING TRUCKS PER DAY																								
CAPACITY OF TRUCK IN TONS		1			1½			2			2½			3			4			5				
GASOLINE—MILES PER GALLON		15			10			7			6½			6			5			4				
MILES OPERATED PER DAY		40	60	100	40	60	100	40	60	100	40	60	100	40	60	100	40	60	100	40	60	100		
FIXED CHARGES	ANNUAL INTEREST	.19	.19	.19	.22	.22	.22	.28	.28	.28	.38	.38	.38	.44	.44	.44	.57	.57	.57	.76	.76	.76		
	INSURANCE	.23	.23	.23	.27	.27	.27	.26	.26	.26	.28	.28	.28	.28	.28	.28	.41	.41	.41	.64	.64	.64		
	DRIVERS WAGES	5.75	5.75	5.75	5.75	5.75	5.75	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00		
	GARAGE	.50	.50	.50	.50	.50	.50	.70	.70	.70	.70	.70	.70	.80	.80	.80	.80	.80	.80	.80	.80	.80		
	LICENSE	.12	.12	.12	.15	.15	.15	.20	.20	.20	.24	.24	.24	.41	.41	.41	.50	.50	.50	.58	.58	.58		
VARIABLE CHARGES	GASOLINE @ 16¢ GAL	.40	.60	1.00	.64	.96	1.60	.80	1.20	2.00	1.00	1.50	2.50	1.08	1.62	2.70	1.32	1.98	3.30	1.60	2.40	4.00		
	LUBRICANTS	.12	.18	.30	.12	.18	.30	.16	.24	.40	.16	.24	.40	.16	.24	.40	.20	.30	.50	.20	.30	.50		
	TIRES (2000 MILES)	.24	.36	.60	.40	.60	1.00	.62	.94	1.57	.76	1.14	1.90	.96	1.44	2.40	1.20	1.80	3.00	1.20	1.80	3.00		
	OVERHAULING (IF TIRES REPAIRED)	.38	.57	.95	.43	.65	1.08	.40	.60	1.00	.45	.67	1.12	.50	.75	1.25	.55	.82	1.37	.60	.90	1.50		
	PAINTING	.04	.07	.11	.05	.08	.14	.06	.09	.10	.09	.13	.22	.12	.18	.30	.12	.18	.30	.12	.18	.30		
	RUNNING REPAIRS	.38	.57	.96	.44	.66	1.10	.47	.71	1.19	.52	.78	1.30	.64	.96	1.60	.80	1.20	2.00	1.00	1.50	2.50		
	DEPRECIATION (100,000 MILES)	.68	1.03	1.72	.91	1.37	2.29	1.14	1.72	2.87	1.33	1.99	3.32	1.52	2.29	3.82	1.94	2.92	4.87	2.37	3.56	5.94		
TOTAL COST PER DAY		9.03	10.17	12.43	9.88	11.39	14.40	11.09	12.94	16.57	11.86	14.10	18.41	12.71	15.91	20.40	14.41	17.45	23.62	15.87	19.42	26.50		

Form of Table for Showing Costs of Operating Motor Trucks of Various Capacities

use of revenue cars. The committee stressed the importance of keeping a record of the daily operating costs for each track and presented forms for keeping such records. An abstract of this report follows.

In order to handle revenue freight more efficiently, some railroads have considered the substitution of motor trucks for work trains for the handling of bridge and building materials and supplies. Where it is practicable to truck less-than-carload lots of material short distances, more equipment is made available for revenue service. There is a tendency to ship light bridge and building supplies by baggage car; this practice should be discouraged where the haul is within the economical trucking radius of a terminal. Emergency repairs to coaling and water stations may also be expedited by trucking men and materials, thus restoring the facilities to service and possibly eliminating overtime.

Suitable highways, preferably paved, between initial and terminal points, are essential for efficient trucking service. Due care should be used in the selection of the make and capacity of trucks, as those of a greater capacity than required result in unnecessary operating expense.

Owing to the nature of the motor truck, the most expensive part, the power unit, must stand idle while the load is being handled. The use of trailers reduces the idle time consumed

administration charges, such as clerical salaries, office rental, supplies, telephone, etc. For an economic comparison with various other transportation costs, it is better to consider the actual operating cost of equipment alone.

The committee recommends the foregoing form for estimating trucking transportation costs. The items which make up the costs are considered in detail, such as initial cost of equipment, fixed expense, running expense and payroll expense. With the expenses itemized in this manner, the unit cost can be readily obtained per day, mile, round trip or ton-mile.

The prices of trucks are usually quoted on the chassis f.o.b. factory. The cab and body should be selected for the requirements of the service. There is a wide variation in price, due to difference in design.

The following prices with respect to capacity are approximate:

Capacity in tons	Cost including stake body
1	\$1,000 to \$1,725
1½	610 to 2,291
2	1,645 to 3,750
2½	3,325 to 4,525
3	2,185 to 3,750
4	4,870 to 5,100
5	5,400 to 5,942

The use of motor trucks for handling bridge and building materials should be considered from the standpoint of economy.



The indirect benefits are the saving of freight cars for revenue service. The Chicago, Milwaukee, St. Paul & Pacific, with 12 trucks in service, saves 50 revenue cars daily; the Southern Pacific saves one-half of a revenue car per day for each truck in service; the Elgin, Joliet & Eastern with one truck, saves from one to two cars per week.

It is difficult to estimate the direct saving, as there are factors entering into the situation on which no data are available. The Southern Pacific estimates that trucks will save 50 per cent of the cost of moving materials with a motor car or push car, and 75 per cent of the expense of handling with a work train. The Akron, Canton and Youngstown, with one truck, saves \$1,200 annually.

The Missouri Pacific shows a saving of 32-man-hours per day per truck as compared with the delivery of the same material with a push car or motor car. This time, computed at 60 cents per hour, makes a daily saving of \$19.20, which will pay for the original investment of a 1½-ton truck in approximately 34 days.

The Great Northern reports that it is impracticable to estimate the annual saving by using trucks to deliver material; however, the work is carried on more efficiently and there is no doubt that considerable economy is effected by using this equipment.

The first truck purchased by the New York, New Haven and Hartford saved enough in two months to pay for the original investment and leave a surplus to pay for gas and oil. It is estimated that each truck saves \$1,000 annually.

It is estimated that the 15 trucks in service on the Delaware, Lackawanna & Western save \$5,000 per year.

### Discussion

This report brought forth a lively and extended discussion which showed a general unanimity of opinion in favor of the use of motor trucks by the bridge and building department, especially in and about large terminals although several emphasized the necessity of keeping these trucks busy if the full economy is to be effected.

C. W. Wright (L. I.) told of the extensive use of motor trucks by the B. & B. department of his road, and was the first speaker to point out the necessity for close supervision of trucks to get maximum service. To remedy the cases where there is not sufficient work to keep trucks busy continuously in bridge and building work, several members described their practice of loaning their trucks to other departments. Chas. Ettinger (I. C.) stated that this was the practice followed on his road, but that when a truck was not in use, its operator was required to clean it up and make such minor repairs as might be necessary. C. R. Knowles (I. C.) stressed the importance of establishing a system where the trucks will be used the greatest number of hours a day. He suggested that in some instances it might prove economical to rent a truck by the hour rather than to purchase one. The value of the motor truck in emergency work was also pointed out by a number of members.

## Placing Culvert Pipe By Jacking or Tunneling

A committee of which F. H. Masters, assistant chief engineer, Elgin, Joliet & Eastern, was chairman, presented a report on the economy of installing culvert pipes through existing embankments by jacking or tunneling instead of by the open-cut method, which usually requires a temporary trestle. The committee, which based its report on information gathered from a number of roads, found that all of the metal or concrete pipes commonly used for culverts can be installed by either jacking or tunneling where the character of the embankment permits their use, and that these methods, besides showing savings in first cost, eliminate delays to traffic and disturbance of the roadbed. The following is abstracted from this report.

The open cut method of installing culvert pipe is expensive and the railroads, with the idea of reducing the costs and avoiding interference to traffic and damage to roadbeds, are making considerable use of the jacking and tunneling methods of culvert pipe installation. It must not be assumed that these methods will replace the trestle and open cut method completely, but they have very definite places in railroad work programs. Judging from the information received, more culverts are being placed by jacking than by tunneling.

The Cincinnati Northern has jacked 24-in. cast iron pipe through the embankments without removing the dirt ahead of the pipe, by using a cone-shaped wooden plug at the end of the pipe, which is started from the upstream side of the fill. The Cleveland, Cincinnati, Chicago & St. Louis has also used cone-shaped plugs in the installation of cast iron pipes of 12-in. to 24-in. diameters. While most of the installations reported are of iron or steel pipe with riveted joints, the Pittsburgh & Lake Erie reports the successful jacking of 48-in. reinforced concrete pipe.

None of the roads using the jacking method of installation report any interruption to traffic or the placing of slow orders during the progress of the work and this is usually cited as the most important reason for using this method. Other advantages mentioned are: Small crew of unskilled men necessary; no work train service; no falsework required; if pipe shows signs of failing, another can be placed inside, and low cost as compared with open trench method.

There is some difference of opinion as to the advisability of jacking pipe in cold weather. One road states that there is danger of the pipe freezing in, thus increasing the cost of jacking, while others say that the method is especially suitable for cold weather because the approach trenches can be brought closer to the tracks, thus decreasing the amount of pipe to be jacked.

In the summary of replies to a questionnaire, the estimated saving is shown as a percentage of the estimated cost of installation by the open cut method. Several of the replies gave labor costs, but on account of the variation in the sizes and lengths of pipes and the differences in soils in which they were placed, actual costs per foot are of little value except as items of interest, since these costs range from \$4.87 to \$10.42 per lin. ft. for the same size of pipe.

For installation by open cut in the lowest fill reported, 8½ ft., where 42 ft. of 36-in. pipe was jacked through, the cost would be approximately \$24.12 per foot of pipe, based on the construction of a 2-bent trestle 14 ft. long, of usable timber and new untreated piles. There is a rapid increase in the cost of trestle work as the height of the fill increases. One road reported the installation of 120 ft. of 60-in. concrete pipe in a 36-ft. fill where the cost of the trestle was \$50.78 per lineal foot of pipe.

Placing pipes in fills by tunneling is an older method than jacking, but comparatively few roads have furnished detailed information about their installations. The method of timbering varies with the kind of soil encountered, in some cases requiring the sides and top to be fully supported, while in others the top only requires full support and bents placed at regular intervals for supporting the top were sufficient to hold the sides. Many roads are using second-hand 8-in. by 8-in. bridge ties, on account of the availability of this material. No cases were reported where any attempt was made to remove all of the timbering after completion.

No interruptions of traffic, other than the placing of slow orders, were reported by roads that installed pipes by tunneling. Other reasons for the use of this method were: No disturbance of roadbed or track; less skilled labor required; no work train service required except for the handling of material to the side of the work; and less material to be handled.

Opinions as to the saving effected by the tunneling method vary widely but most users of the method state that there is a saving, based mainly on the lack of interference to traffic. Actual costs are governed by local conditions and, therefore, cannot be used as a guide to procedure for a new job. One road reported the installation of a line of 12-in. cast iron pipe and a line of 14-in. cast iron pipe in two 3-ft. by 4-ft. tunnels, located in a 14-ft. fill and near enough together to enable one gang to handle both jobs, where the labor costs were \$5.30 per foot.

Another road reported costs as shown in the accompanying table.

Size of Pipe		Cost of Installation		
Diameter—In.	Length—Ft.	Labor	Material	Total
24	56	8.78	1.55	10.33
24	64	9.29	1.52	10.81
24	80	9.35	1.47	10.82
36	80	11.80	4.07	15.87
48	112	7.05	8.18	15.23

Still another road reported an installation of 30-in. cast iron pipe in a 5-ft. by 6-ft. tunnel 37 ft. below the base of rail. This work was done by a contractor and the price of \$12 per foot for the tunnel evidently included labor and material.

### Discussion

The discussion on this report indicated the active interest in this subject and made it clear that an increasing number of roads are adopting the jacking method with considerable success and economy. A number of members described in detail their practice in carrying out this type of work, which included the placing of cast iron, corrugated iron and concrete pipe. C. R. Knowles (I. C.) supplemented the report, which dealt largely with pipes of large diameter, by describing the success which his road has had in applying the jacking method to water pipes of 8 and 10 in. diameter. H. I. Benjamin (S. P.) indicated that it has been his experience that the jacking method costs 33 per cent less than tunneling and only one-third that of trenching. Among others who reported success with the jacking method, A. W. Spalding (Ingot Iron Railway Products Co.) stated that his company had installed over 600 culverts by the jacking method, with only three failures, and with an estimated saving over other methods of about \$1,200,000.

## Co-operation Between Store Department and Field Forces

The influence of close co-operation between the store department and the using department on the orderly carrying on of work and in a reduction in the amount of stocks carried was shown in a committee report presented by L. M. Bates, division engineer, Chicago & North Western. The report covered the issuance of requisitions and the delivery of materials; the control of line and emergency stocks, excess material and reclamation, and emphasized the importance of an annual program of work to permit the store department to budget its needs as far in advance as possible. This report is abstracted as follows:

The general storekeeper is usually the custodian of all materials and supplies, including those issued to the using force in the field and which remains unused. If this latter material is not properly supervised by the using department, the general storekeeper needs to exercise his authority as custodian to direct it into channels where it will be consumed.

The first point of contact with the store department arises in the ordering of material. Usually seasonal requisitions are made on the general storekeeper by a general officer of the using department. For some work requisitions are made direct on the local storekeeper by the division officer; generally, however, requisitions are prepared by division officers, sent to the department head for approval and then to the general storekeeper.

### Recommendations

1. The committee does not propose any change in the methods used by the various railroads in presenting requisitions to the general storekeeper, although these vary considerably.
2. It is the duty of the using department to make a careful and detailed inspection at least once a year, of the property under its supervision and from this inspection to prepare a forecast of the material needed for repairs for the ensuing year or season.
3. Blanket requisitions are also to be prepared on estimates so that material needed may be purchased on a competitive basis and carried for use when needed.
4. A program should be prepared showing in detail the work to be done, the material necessary for each project, and the anticipated date the repairs will be made so that the material will be on the ground by the time the repair work is scheduled to be done. Storekeepers should send the material as specified.
5. The using department should specify the kind and quality of material needed. Special items should show the manufacturer's name, catalog number, item and page.

6. There is a tendency for the using department to requisition everything for immediate delivery. This frequently causes material to be delivered long before it is needed, and tends to belittle the significance of the term "RUSH" on requisitions when material is really wanted at once.

7. Requisitions should in all cases show the date that material is required in the field.

### Delivery of Material

Several methods are used in distributing material from the general or division stores to the using department, including (a) regular scheduled supply trains; (b) l.c.l. freight; (c) supply cars on local freights, and (d) carload shipments.

In the operation of the supply train, and, in some cases, the supply cars, the division officers and representatives of the store department accompany the train. In this manner a good inspection of the property can be made, material stocks checked up, and any controversy regarding the amount of stock carried can be settled while the train is there. Maintenance men assist the store department in handling this material.

Locomotive and other rail caterpillar cranes, equipped with electric magnets, are being utilized in unloading track materials and picking up scrap, reducing train hours as well as eliminating a great deal of maintenance labor.

The l.c.l. method of handling material is not as reliable as the supply car or supply train and will often cause delays in delivery owing to material going astray at transfer points, the misplacing of way bills, poor marking, or other causes.

The straight-carload shipment is probably best fitted for the handling of bridge and building materials, as bulky supplies can be shipped direct to points designated and then handled either by local freight or by work trains.

### Recommendations

1. The supervisor should take into consideration the method of delivery of material and issue requisitions accordingly.
2. The general storekeeper should ask advice of receipt of all material, especially if the l.c.l. or straight-car method is used, and if the material has not been received it should be traced. If lost material cannot be located after a reasonable time, a second shipment should be made.
3. Supply trains should be utilized for all classes of material possible. It is found that trains equipped with cranes facilitate the handling of bridge and building as well as track material.

### Line Stock

Line stock can be considered to include all unapplied material not located in store buildings or yards, and should have the supervision not only of the store department but of the using department as well, and its disposition should be made to the best interests of the railway. It would be fair for a maintenance officer to reject a shipment of material which is in excess of his program or which has been received too late for current use. The chief aim of the store department should be service, and the assistant storekeepers on the line should act more as advisers than supervisors.

### Recommendations

1. The using department can co-operate by reducing as much as possible the accumulation of material on the line. Requisitions should be made for current needs only.
2. The stores department can accomplish a great deal by calling attention to slow moving stock.
3. Schedules should be prepared which should have the approval of the engineer of maintenance, as well as the general storekeeper, showing the amount of material each bridge outfit, section tool house or signal maintainer should carry in stock for current needs, determined by the method of delivery in use.
4. All excess material should be returned promptly after the completion of a special job.

### Annual Program

As stated previously, the general storekeeper should be fully advised as to the material requirements for the coming year, but the field force should determine when the material is to be used and delivered.

A budget system for material, made up from the season's program, has proved satisfactory from the viewpoint of the stores department and has shown a marked decrease in line stock especially, and a decided decrease in operating expenses.

### Recommendations

1. Maintenance work should be programmed by each division and consolidated in a general program by the engineer maintenance of way.



2. Upon confirmation of the program, the division engineer and supervisor should arrange programs with the local storekeeper for the delivery of material.

3. Division officers in the using department should notify the local storekeeper of any change in the program affecting the delivery of material. The engineer of maintenance and the general storekeeper should receive copies of this notice.

4. Material for specific jobs should be assembled at the general stores before shipment. The date of delivery should be plainly stated on the requisition. The general storekeeper should notify the division officers when there is a possibility of delay in obtaining material so that the program can be changed in the field to meet this contingency and the crew's program rearranged accordingly.

### Reclaim Yards and Emergency Stocks

Reclaim yards generally are under the control of the general store department, but in a few instances the using department has charge of them. Where the using department has control of the yards, we find a more satisfactory classification of the material and the forces in the field are assured of a better class of usable material being sent out. This results in a saving in operating expense; (1) in the possible elimination of back haul of material; and (2) in a more accurate salvage system, eliminating the unnecessary purchase of material and the classifying of serviceable material.

Emergency stock, when stored at points other than the general or division stores, must be considered as line stock and handled by the general storekeeper. Maintenance of way officers are generally in favor of storing this material at division stores, where a crew can generally be loading cars while the work train is being called and made up. Where emergency stock is stored at points outside of division headquarters, care should be taken to insure that material is left on the ground for a limited time only, to prevent deterioration. Supervisors should give this stock careful inspection from time to time.

Emergency stock for water supply is generally kept at the headquarters of the supervisor of water supply. As this is line stock and is carried as surplus by the general stores, it is under the control of the general storekeeper until used. Where pumps and water cranes are standardized over a division or district, this material can be kept in stock at the division stores, with a strict understanding that no shipment will be made until after conference with the supervisor of water supply.

### Conclusions

The total value of supplies carried in stock and on hand by 114 roads at the close of 1927 amounted to \$518,583,494, a reduction of approximately \$27,000,000 from the figure at the close of 1926. Of these 114 roads, 71 showed reductions, while 43 showed increases.

In 1926, U. K. Hall, general supervisor of stores, Union Pacific system, summarized the cost of carrying materials as 15 per cent. We believe that this figure is conservative, but, using it as a basis for computing the cost of carrying this material on hand during 1927, we find that the expense for carrying this large inventory amounts to practically \$77,700,000. It may also be of interest to note that where the replies we have received to questionnaires state that close co-operation exists between field forces and the store departments, we find that these same roads are included in the reduction column.

### Discussion

From the discussion following this report, it was evident that those present were more than anxious to see closer co-operation between their own department and the stores department. Many suggestions were made to this end, several being brought out by W. T. Krausch (C. B. & Q.) who stated that when making requisitions field conditions and method of delivery should be taken into consideration. He also stressed the importance of exercising care in making requisitions and in checking materials when received so as to avoid the necessity for rush or emergency requisitions later.

Rush requisitions were criticised by a number of those who discussed the report. Among these were J. S. Huntoon (M. C.), C. R. Knowles (I. C.) and P. Hofaker (L. V.) who pointed out the increasing ineffectiveness of the word "Rush" on requisitions. In its place they recommended stating specifically the date

on which material is desired. This they claimed gave the storekeeper something definite to work on. H. I. Benjamin (S. P.) concurred in this opinion and outlined the success of this practice on his road. Chas. Ettinger (I. C.) stressed the importance of maintaining a close and frank relationship with the stores department, and the necessity for the exercise of diplomacy on the part of all concerned in the handling and ordering of supplies and materials. Mr. Knowles emphasized the importance of keeping the stores department informed of requirements as far in advance as possible so as to permit proper handling, and also to help in the reduction and control of stock. He laid particular emphasis upon the importance of stock reduction and brought forth further discussion by other members present who outlined practices on their roads designed to bring this about.

## Control of Motor Cars To Prevent Accidents

This committee, of which W. A. Batey, general bridge and building inspector, U. P., Omaha, Neb., was chairman, submitted a thorough discussion of the points to be observed in the prevention of motor car accidents and summarized these in a compilation of suggestions from which rules can be formulated to conform to the conditions on any individual road. Owing to the report only a brief abstract can be given.

### Number of Motor Cars in Service

At the present time it is estimated that there are 55,000 motor cars in service on American railroads, representing an investment of between \$11,000,000 and \$12,000,000, nearly 40,000 of which cars are used in maintenance of way work. The fact that practically no physical effort is required in the operation of the car, has resulted in the full energy of the men being made available when the job is reached. One well known railroad has reduced the time moving from point to point and to and from the work 50 per cent by an intensive time study of bridge and building gang operations and the resultant programming of work, with the elimination of the haphazard handling of gang movements.

Each time a motor car is used, a potential opportunity is presented for accident or personal injury. To forestall accidents at the source requires that the motor car be properly equipped with safety devices, be dependable at all times, be correctly and constantly maintained and be sensibly used.

This committee presents this compilation of suggestions as derived from a study of the information furnished by 25 large railroads, not as a set of rules to govern each railroad in detail, but because each suggestion carries essential value and from them can be formulated rules conforming to each road's individual conditions.

### Rules for All Employees Using Motor Cars

Track cars must be used only on railroad business, except by special permission from the proper officer, and then only when accompanied by the foreman.

No persons, other than employees in the performance of their duties, will be permitted to ride on track cars without an order signed by the superintendent.

All operators of track cars must be examined on the rules, sight and hearing, should carry standard watches and be subject to time-service rules.

Foremen and others in charge of track cars must, before starting on each trip, make a careful inspection and know that the car is in condition for safe operation. Motor cars must not be operated unless equipped with safety rails, and front and rear tool guards. Immediately before starting, brakes must be tested to know that they are in proper working condition. Do not use the brake suddenly without warning all others on the car. Before starting, there should be a thorough understanding as to what part each person is to take in handling the car if an emergency should arise.

Cars should not be placed on or taken off the track with the motor running. Before starting, see that the required

flagging equipment is in its place on the car. A metal case should be provided for the fuses and torpedoes. All flagging equipment must be kept in readiness for instant use. Lights must be displayed at both front and rear ends of motor cars at night.

All persons riding must be seated and the capacity of the car limited to the number of seats available. Trailers must be provided where the size of the gang prevents all from being seated on the motor car. No make-shift seats will be tolerated. No one shall be permitted to ride on a flat-top push car.

Men should be assigned to face both forward and backward to act as lookouts, and no man should be permitted to sit where the operator's vision may be obscured. Place no material or tools where there can be any possibility of fouling the brake lever or movable parts. Water kegs, track jacks and other tools, or materials likely to derail the car, must be carried on the side or rear of the car.

When pulling a push car behind a motor car, care should be exercised to fasten all material on the push car securely to avoid any part falling off which would be likely to derail following cars or trains. When necessary to operate two or more cars connected, rigid couplers must be provided, and coupler pins must be of such type that no chance of their working out can develop. The motor car must be in advance and other cars pulled, never pushed. Men must never sit with their feet between the motor car and trailer.

Cars must be run with great caution at all times, particularly at night and during foggy or severe weather. If operated in stormy weather or at night where communication cannot be established with the dispatcher, the movement may be made under flag protection.

Each employee should feel his individual responsibility in the operation of motor cars; relief from this duty does not begin until the car has been taken from the track and locked securely or housed.

Constant lookout must be kept for chickens, dogs, or other animals or objects which are apt to be struck, whereby the car may be derailed.

Cars must be run slowly when passing cars standing on an adjacent track, and a sharp lookout must be kept for persons who may step out from between such cars. Cars must not pass between a train and a platform at which passengers are being discharged or received, except where there is a fence between the tracks. On lines of more than one main track, cars must be stopped, and all men must dismount and stand clear of both tracks during the passage of a train on an adjacent track.

Motor cars must be run with the current of traffic on multiple track lines. General managers may specify certain locations where it is advisable to deviate from this rule on account of grades, curves, etc. A distance of at least 500 ft. should be maintained between a motor car and any other car on the rear end of a moving train. Certain districts may require a distance of 1,000 ft.

Motor, hand or push cars must not be fastened to the rear of trains and men must not be allowed, when on such cars, to hold to the rear of a train.

When two or more men are with a motor car, they should flag at all curves and cuts where the view is obstructed, or the side clearance is not sufficient to take off the car. If the car is operated with only one man, he must proceed with extreme care, keeping a sharp lookout for trains and motor cars in both directions.

Heavily loaded track cars which cannot be removed from the track promptly must be protected in both directions by stop signals. Heavy material must not be carried on motor cars except in emergencies. Adjustments must not be made to a motor or a car while the car is moving, except that the carburetor may be adjusted, providing a sharp lookout is kept ahead and there is no accident hazard.

Employees must not get on moving track cars, except when it has been necessary to push them along the track in order to start them, in which case the pushing must be done only at the rear end of the car, after which those pushing may get on the car at the rear end only. When a direct-connected track motor car is coupled in front of a push car or any other track car not equipped with safety hand rails, it may be started by not more than one man on each side pushing on the hand rail of the front end of the car. Employees must not get off moving track cars except in emergencies.

Motor cars should not be run at a speed in excess of 15 mile per hour. Cars must be run not to exceed six miles per hour over frogs, switches, road crossings, track instruments, or through stations and interlockings. When approaching highway or street crossings at grade, cars must be under com-

plete control and before crossing, unless an unobstructed view of at least 200 ft. can be had along the highway or street in both directions, cars must be brought to a complete stop. If the crossing is protected by a flagman, the operator must get a signal from him before proceeding.

When the rails are slippery on account of wet weather or frost, a greater distance is required to stop a car, and the man operating the car must take these conditions into account. A vehicle has the right to cross ahead of the motor car. When a motor car and a vehicle approach a crossing simultaneously, the motor car should stop and the vehicle be signaled to cross ahead of the motor car.

Cars must not be run through the spring-rail side of frogs and must come to a full stop before passing over interlocked derails or switches and be pushed by them. Switches must not be thrown for motor cars but the cars shall be lifted over the points. Switches may be thrown for motor cars when pulling heavily loaded push cars, but only under the personal supervision of the foreman, and the switches must be returned immediately to their proper positions and securely locked.

Torpedoes exploded by track cars must be replaced by the operator of the car or the flagman, the responsibility resting with the operator of the car. Cars must not be run on foreign lines unless authorized by proper officers of the home line and of the line over which the cars are to be operated.

Persons in charge of motor cars will be required at all times to keep themselves informed as to train movements in the vicinity of their operations. The foreman or operator must watch closely for signals carried by trains so as to know if additional sections are coming. Dispatchers will give lineups to foremen of gangs and other parties operating motor cars when requested. Persons receiving this information must understand that they are given such lineups as a matter of information only and that these lineups do not relieve them of responsibility. They must protect themselves wherever and whenever necessary.

Motor cars should not be set off on public highways, neither should they be left with insufficient clearance when removed from the rails. Leaving motor cars on the rails unattended is prohibited. Track cars must be set off the track while work is being done.

The use of fire for the purpose of heating the engine of a motor car in cold weather is prohibited; explosions may occur.

Cars must not be run in a closed car house, as carbon monoxide gas is fatal. Gasoline shall be handled only in the daytime. Open lights of any description or smoking must not be permitted on or around the motor car or gasoline storage while tanks are being filled with gasoline. Cars must not be filled with gasoline while the engine is running. Cars must be shipped as seldom as possible. Fuel tanks must be thoroughly drained before shipment.

Excessive side play in bearings must not be allowed. Cars must not be used with any part worn or broken, which is liable to cause an accident.

Scuffling on motors or trailer cars is prohibited. Excessive or bulky clothing such as to impair vision or hearing should not be worn on motor cars. Turned-up overalls (unless stitched), or ragged or torn overclothes should not be worn.

In using cars on double track, remember that trains are to be expected from either direction on both tracks.

Don't imagine these safety rules apply only to someone else. They are intended for everyone.

### Discussion

The extended discussion of this report indicated the intense interest of those present in the safety of motor car operation. C. R. Knowles (I. C.) presented statistics showing that 90 per cent of motor car accidents can be prevented by careful observance of the rules. The observation that a large percentage of motor car accidents occur to supervisory officers led Mr. Knowles, C. J. Geyer (C. & O.), T. Turnbull (Ann Arbor), P. Hofecker (Leigh Valley) and others, to emphasize the importance of supervisory officers practicing at all times in motor car operation the rules which they formulate for their men. They dealt pointedly with the subject of speed and brought out a favorable expression of opinion on a general rule that car operators, including officers, should not exceed a speed at any time which will prevent stopping their cars within one-half the range of their vision. General agreement was ex-

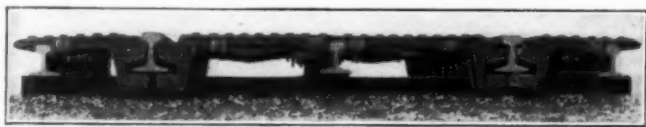


pressed with the committee's recommendation favoring soft iron brake shoes over wood or leather. On the subject of line-ups for car operators there was also general agreement, although it was pointed out repeatedly that car operators should not depend entirely on a line-up received, or reduce in any way their vigilant lookout for approaching trains. Several members reported the successful practice of supplying all motor cars with portable telephones and one member told of the awarding of certificates of merit to car operators with good safety records. The necessity for daily and periodic inspection of cars and of carefully training and educating foremen and motor car inspectors in safety practices was also stressed as of primary importance.

[The report of the proceedings of the remainder of the session will appear in next week's *Railway Age*.—EDITOR.]

## The "Bull Frog" Highway Crossing

THE increased weight of highway traffic occasioned by the use of automobile motor coaches and auto trucks has intensified the demand for highway crossings which provide durability and a satisfactory surface, while the increasing loads and speeds of railway traffic require that the track be maintained in better condition than ever before. In order to furnish a crossing which fulfills the first of these conditions and which may be removed easily to permit work on the track and as easily replaced, the Indianapolis Switch



Sectional View of Installation

& Frog Company, Springfield, Ohio, has placed on the market a crossing composed of interlocked metal plates, which it has designated the Bull Frog unit paving.

The metal of which the plates are composed is said to resist heavy impact without breakage and to provide a factor of safety of 100 per cent for the crossing under the maximum loads now carried by highway vehicles and the anticipated increase of these loads. The plates are made in standard lengths of 20 in. and in two standard widths, those used between the rails of the track being approximately 28 in. wide, while the approach plates outside the rails are 20 in. wide. Each plate interlocks with adjacent plates and is anchored to the base of the track rail by jaws which are protected from direct contact with the metal by heavy blocks of resilient material, similar to that employed in the manufacture of solid rubber tires, these blocks serving the triple purpose of providing insulation in track-circuit territory, preventing wear or breakage of the jaws by eliminating contact of metal with metal, and absorbing shocks from loads passing over the crossing, this cushioning effect also eliminating noise. The jaws are so arranged that the blocks supporting the cushion can be raised or lowered to fit various sections of rail, thus permitting the plates to be transferred to other points for use, regardless of the weight of rail, in case a cross-

ing where they are installed is discontinued for any reason. The surface of the plates are provided with bosses to do away with the hazard of skidding while on the crossing.

The plates are supported at their free ends by stringer rails, for which second hand rails, one inch less in height than the running rails, may be used. One of the stringer rails coincides with the center line of the track, to receive the ends of the plates between the running rails while the stringer rails for the approach plates are located near the ends of the ties. The under sides of the plates are provided with lugs which fit against the heads



The Metal Plates Provide a Satisfactory Surface

of these rails. In installing these crossings, the laying of the plates is begun at the center and carried each way to the ends, thus permitting work to proceed simultaneously at six different points; two between the rails and four outside the rails. The operation does not require skilled workmen and the size and weight of the plates permit them to be handled easily by the trackmen. After the plates have been placed in position, beveled timber blocks are spiked to the ties at the ends of the crossing to prevent their being displaced by dragging equipment or malicious trespassers. When necessary to uncover the track, the wooden blocks are taken up and the plates are removed in the reverse order from which they were laid. Unless it is necessary to expose the track for the full length of the crossing at one time, part of the crossing may be left in service while the remainder of it is removed. Also, if desired, the plates between the rails may be removed without disturbing the side plates, or vice versa.

While it is preferable that the surface of the crossing and the roadway on either side be at the same level, minor differences may be adjusted by varying the heights of the supports of the approach plates. Since the construction of the crossing insures that it will maintain a fixed relation to the track structure, settlement of the track or its subsequent raising has no ill-effect on the surface of the crossing.

It is said that these crossings, including the stringer rails, can be installed at a labor cost of five cents a lineal foot and that the maintenance and depreciation costs are negligible.

THE COST OF THEFTS of merchandise as reported by the Claim department of the American Railway Express Company, for the first three months of 1928, was \$25,000 less than the cost of the same item in the first quarter of 1927. This statement was made by an officer of the express company in Atlanta, Ga., last week, at a large meeting of railroad special agents and protective officers; and the express official gave large credit for this improvement to the railroad policemen and detectives.

# Unit Costs of Railroad Service

*I. C. C. Bureau of Statistics compares results  
for years 1915-1927*

WASHINGTON, D. C.

WHILE railway operating revenues paid by the public per net freight ton-mile were 51.4 per cent greater in 1927 than the average for the three-year "test period" ended June 30, 1917, the investor's share out of the rates and fares paid by the public (the net railway operating income) was only 27.4 per cent greater, according to a study submitted to the Interstate Commerce Commission by Dr. M. O. Lorenz, director of the Bureau of Statistics, entitled "Unit Costs of Railroad Service, 1915-1927." This brings down to 1927 the tables in Statement No. 26,169,

taxes (including certain rentals) is the investor's residual share out of the rates and fares paid by the public, and may be more or less than the cost of the annual use of the railway plant and facilities. The following explanation should be noted: Operating expenses are combined with hire of equipment and joint facility rents; railway operating revenues are as reported after the deduction of uncollectible railway revenues; the net railway operating income is what is left out of revenues after deducting the expenses, rents, and taxes. In two of the units used, there is no separation between services, the "train-mile" and "car-mile" referring to all services—freight, passenger, and other, taken together. In computing the "net freight ton-mile" and "passenger train car-mile" averages, the operating

Table A—Unit Costs of Railroad Service, 1915-1927—Class I Roads, by Districts

UNITED STATES																	
Year ended	Per train-mile				Per car-mile—cents				Test period average	Per net freight ton-mile—mills				Per passenger train car-mile—cents			
	Oper. exp. & rents	Taxes	Net ry. oper. in- come	Ry. oper. reve- nues	Oper. exp. & rents	Taxes	Net ry. oper. in- come	Ry. oper. reve- nues									
Test period average	\$1.945	\$0.131	\$0.754	\$2.830	9.063	.609	3.516	13.188	5.133	.344	1.901	7.378	17.981	1.218	7.866	27.065	
June 30, 1915...	1.825	.118	.607	2.550	8.815	.572	2.931	12.318	5.453	.353	1.710	7.516	17.354	1.131	6.643	25.128	
1916...	1.885	.122	.825	2.832	8.657	.560	3.788	13.005	4.865	.313	2.186	7.364	17.702	1.159	7.173	26.034	
Dec. 31, 1916...	1.960	.128	.850	2.938	8.988	.588	3.897	13.473	4.892	.319	2.163	7.374	18.270	1.208	7.464	26.942	
1917...	2.316	.173	.755	3.244	10.676	.797	3.480	14.953	5.529	.411	1.533	7.473	19.520	1.474	9.375	30.369	
1918...	3.418	.....	.....	.....	15.388	.....	.....	.....	7.666	.....	.....	.....	27.548	.....	.....	.....	
1919...	3.986	.....	.....	.....	17.916	.....	.....	.....	9.269	.....	.....	.....	31.121	.....	.....	.....	
1920...	4.917	.....	.....	.....	21.888	.....	.....	.....	10.775	.....	.....	.....	40.229	.....	.....	.....	
1921...	4.250	.253	.551	5.054	19.424	1.156	2.517	23.097	10.963	.651	1.601	13.215	36.196	2.167	3.148	41.511	
1922...	4.078	.273	.690	5.041	18.114	1.213	3.062	22.389	9.685	.648	1.877	12.210	34.926	2.347	3.555	40.828	
1923...	4.135	.275	.796	5.206	17.070	1.135	3.288	21.493	9.067	.602	1.918	11.587	34.431	2.303	4.697	41.431	
1924...	3.930	.290	.831	5.051	16.029	1.184	3.390	20.603	8.723	.644	2.193	11.560	32.918	2.436	3.369	38.723	
1925...	3.909	.302	.944	5.155	15.156	1.171	3.662	19.989	8.267	.639	2.441	11.347	32.151	2.484	2.932	37.567	
1926...	3.944	.321	1.001	5.266	14.710	1.197	3.734	19.641	8.023	.651	2.506	11.180	31.363	2.575	2.601	36.539	
1927...	3.960	.317	.902	5.179	14.533	1.165	3.309	19.007	8.103	.646	2.422	11.171	31.351	2.554	.765	34.670	

issued in August, 1926, for the purpose of showing the changes in railway operating expenses, taxes, and the share of the investor upon a unit basis. The study also shows that as compared with the test period the operating expense per net freight ton-mile has fallen each year except 1927 since the 1921 maximum.

The text of the statement, with the tables for the roads of the United States, but omitting the district figures, follows:

The purpose is to show the changes in operating expenses, taxes, and the share of the investor upon a unit basis. The general heading "Unit Costs" is in some respects misleading since only the operating expenses and taxes are costs in a strict sense. The net railway operating income above expenses and

expenses were separated between freight service and passenger service (including allied services), the separation being as reported by the railways under the formula in force. Taxes were apportioned on the basis of the expenses, and the net railway operating income was obtained by deducting the sum of the preceding items from the revenues. It will be noted that in computing the relative figures, in Table B the averages for the test period, which covers the three years ended June 30, 1917, were taken as 100 per cent. In drawing conclusions from these figures, it should be kept in mind that the trainload and the carload have increased in size in the period covered.

It appears from Table A that for the United States as a whole and for each one of the districts, the operating expense per net freight ton-mile has fallen each year except 1927 since the 1921 maximum. In 1921, taking the United States as a whole, the average was 113.6 per cent above the corresponding test period average, while in 1927 the excess was only 57.9 per

Table B—Unit Costs of Railroad Service, 1915-1927—Class I Roads, by Districts  
Relative figures based on Table A

UNITED STATES																	
Year ended	Per train-mile				Per car-mile				Test period average	Per net freight ton-mile				Per passenger train car-mile			
	Oper. exp. & rents	Taxes	Net ry. oper. in- come	Ry. oper. revenues	Oper. exp. & rents	Taxes	Net ry. oper. in- come	Ry. oper. revenues									
Test period average	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
June 30, 1915...	93.8	90.1	80.5	90.1	97.3	93.9	83.1	93.4	1915...	106.2	102.6	90.0	101.9	96.5	92.9	84.5	
1916...	96.9	93.1	109.4	100.1	95.5	92.0	107.7	98.6	1916...	94.8	91.0	115.0	99.8	98.4	95.2	91.2	
Dec. 31, 1916...	100.8	97.7	112.7	84.7	99.2	96.5	110.8	102.2	1916...	95.3	92.7	113.8	99.9	101.6	99.2	94.9	
1917...	119.1	132.1	100.1	114.6	117.8	130.9	99.0	113.4	1917...	107.7	119.5	80.6	101.3	108.6	121.0	119.2	
1918...	175.7	.....	.....	.....	169.8	.....	.....	.....	1918...	149.3	.....	.....	.....	153.2	.....	.....	
1919...	204.9	.....	.....	.....	197.7	.....	.....	.....	1919...	180.6	.....	.....	.....	173.1	.....	.....	
1920...	252.8	.....	.....	.....	241.5	.....	.....	.....	1920...	209.9	.....	.....	.....	223.7	.....	.....	
1921...	218.5	193.1	73.1	178.6	214.3	189.8	71.6	175.1	1921...	213.6	189.2	84.2	179.1	201.3	177.9	40.0	
1922...	209.7	208.4	91.5	178.1	199.9	199.2	87.1	169.8	1922...	188.7	188.4	98.7	165.5	194.2	192.7	45.2	
1923...	212.6	209.9	105.6	184.0	188.4	186.4	93.5	163.0	1923...	176.6	175.0	100.9	157.0	191.5	189.1	59.7	
1924...	202.1	221.4	110.2	178.5	176.9	194.4	96.4	156.2	1924...	169.9	187.2	115.4	156.7	183.1	200.0	42.8	
1925...	201.0	230.5	125.2	182.2	167.2	192.3	104.2	151.6	1925...	161.1	185.5	128.4	153.8	178.8	203.9	37.3	
1926...	202.8	245.0	132.8	186.1	162.3	196.6	106.2	148.9	1926...	156.3	185.8	131.8	151.5	174.4	211.4	33.1	
1927...	203.6	242.0	119.6	183.0	160.4	191.3	94.1	144.1	1927...	157.9	187.8	127.4	151.4	174.4	209.7	9.7	



cent. This is the combined result of a revival of traffic, lower unit material and labor costs, and increased economy or efficiency. Taxes per net freight ton-mile in 1927 were 87.8 per cent above the test period average. The investor's share per net freight ton-mile was 27.4 per cent greater, while the operating revenues paid by the public were 51.4 per cent greater. The ton-mile averages, expressed in mills, are shown below by districts:

Item	Mills per freight ton-mile					
	Eastern District		Southern District		Western District	
	Test period*	1927	Test period*	1927	Test period*	1927
Operating expenses and rents.....	4.977	8.667	4.426	6.332	5.718	8.553
Taxes .....	0.282	0.609	0.306	0.574	0.453	0.739
Net railway operating income (investor's share)....	1.500	2.040	1.761	2.359	2.551	2.934
Railway operating revenues .....	6.759	11.316	6.493	9.265	8.722	12.226

\* Three years ended June 30, 1917.

The investor's share per net freight ton-mile was greater in 1927 than the test period average in each of the three districts, but the increase was relatively less than for expenses, taxes, or revenues.

Since 1921, the year of conspicuously depressed traffic, the taxes per net freight ton-mile have increased in the East and South, but have fallen in the West. The investor's share on this unit basis has increased since 1921 generally in all districts in spite of a reduction in operating revenues per ton-mile.

The expense per passenger train car-mile for the United States was 74.4 per cent greater in 1927 than in the test period, and the taxes 109.7 per cent greater. As the revenues were only 28.1 per cent greater, the investor's share was less per passenger train car-mile in 1927 than in the test period. The following is a summary of the averages, in cents, per passenger train car-mile for 1927 and the test period by districts:

Item	Eastern District		Southern District		Western District	
	Test period*	1927	Test period*	1927	Test period*	1927
	Test period*	1927	Test period*	1927	Test period*	1927
Operating expenses and rents.....	19.491	34.030	15.701	29.191	17.308	29.432
Taxes .....	1.103	2.448	1.085	2.640	1.372	2.631
Net railway operating income (investor's share)....	7.882	4.562	7.955	4.456	7.822	4.203
Railway operating revenues .....	28.476	41.040	24.741	30.375	26.502	29.760

\* Three years ended June 30, 1917.

d Deficit.

The expense per passenger train car-mile has decreased each year since 1920 for the United States. In all districts the operating revenues as well as the expenses for this unit in 1927 show a decrease since 1921. The investor's share shows a small increase in the Eastern district and decreases in the Southern and Western districts, resulting in a failure to cover operating expenses and taxes in 1927, in both of these districts.

## Hoover Finds Government Incompetent in Business

A COMPARISON of the results of railway operation by the government during the war period and under private management since then was used by Herbert Hoover, Republican nominee for President, in his address at New York on October 22, to illustrate his remarks in opposition to the idea of injecting the government into business in competition with its citizens.

"There is no better example of the practical incompetence of government to conduct business than the history of our railways," he said. "During the war the government found it necessary to operate the railways. That operation continued until after the war. In the year before being freed from government operation they were not able to meet the demands for transportation. Eight years later we find them under private enterprise transporting 15 per cent more goods and meeting every demand for service. Rates have been reduced by 15 per cent and net earnings increased from less than 1 per cent

on their valuation to about 5 per cent. Wages of employees have improved by 13 per cent. The wages of railway employees are today 121 per cent above pre-war, while the wages of government employees are today only 65 per cent above pre-war. That should be a sufficient commentary upon the efficiency of government operation."

In discussing the general question of government conduct of business Mr. Hoover also said in part:

During the war we necessarily turned to the government to solve every difficult economic problem. The government having absorbed every energy of our people for war, there was no other solution. For the preservation of the state the federal government became a centralized despotism which undertook unprecedented responsibilities, assumed autocratic powers, and took over the business of citizens. To a large degree we regimented our whole people temporarily into a socialistic state. However justified in time of war, if continued in peace time it would destroy not only our American system but with it our progress and freedom as well.

When the war closed, the most vital of all issues both in our own country and throughout the world was whether governments should continue their wartime ownership and operation of many instrumentalities of production and distribution. We were challenged with a peace-time choice between the American system of rugged individualism and a European philosophy of diametrically opposed doctrines—doctrines of paternalism and state socialism. The acceptance of these ideas would have meant the destruction of self-government through centralization of government. It would have meant the undermining of the individual initiative and enterprise through which our people have grown to unparalleled greatness. . . .

I should like to state to you the effect that this projection of government in business would have upon our system of self-government and our economic system. That effect would reach to the daily life of every man and woman. It would impair the very basis of liberty and freedom not only for those left outside the fold of expanded bureaucracy but for those embraced within it.

Let us first see the effect upon self-government. When the federal government undertakes to go into commercial business it must at once set up the organization and administration of that business, and it immediately finds itself in a labyrinth, every alley of which leads to the destruction of self-government.

Commercial business requires a concentration of responsibility. Self-government requires decentralization and many checks and balances to safeguard liberty. Our government to succeed in business would need become in effect a despotism. There at once begins the destruction of self-government.

The first problem of the government about to adventure in commercial business is to determine a method of administration. It must secure leadership and direction. Shall this leadership be chosen by political agencies or shall we make it elective? The hard practical fact is that leadership in business must come through the sheer rise in ability and character. That rise can only take place in the free atmosphere of competition. Competition is closed by bureaucracy. Political agencies are feeble channels through which to select able leaders to conduct commercial business.

Government, in order to avoid the possible incompetence, corruption and tyranny of too great authority in individuals entrusted with commercial business, inevitably turns to boards and commissions. To make sure that there are checks and balances, each member of such boards and commissions must have equal authority. Each has his separate responsibility to the public, and at once we have the conflict of ideas and the lack of decision which would ruin any commercial business. It has contributed greatly to the demoralization of our shipping business. Moreover, these commissions must be representative of different sections and different political parties, so that at once we have an entire blight upon co-ordinated action within their ranks which destroys any possibility of effective administration.

Moreover, our legislative bodies cannot in fact delegate their full authority to commissions or to individuals for the conduct of matters vital to the American people; for if we would preserve government by the people we must preserve the authority of our legislators in the activities of our government.

Thus every time the federal government goes into a commercial business, 531 Senators and Congressmen become the actual board of directors of that business. Every time a state government goes into business one or two hundred state senators and legislators become the actual directors of that business.

Even if they were supermen and if there were no politics in the United States, no body of such numbers could competently direct commercial activities; for that requires initiative, instant decision, and action. It took Congress six years of constant discussion to even decide what the method of administration of Muscle Shoals should be.

When the federal government undertakes to go into business, the state governments are at once deprived of control and taxation of that business; when a state government undertakes to go into business, it at once deprives the municipalities of taxation and control of that business. Municipalities, being local and close to the people, can, at times, succeed in business where federal and state governments must fail.

We have trouble enough with log rolling in legislative bodies today. It originates naturally from desires of citizens to advance their particular section or to secure some necessary service. It would be multiplied a thousand-fold were the federal and state governments in these businesses.

The effect upon our economic progress would be even worse. Business progressiveness is dependent on competition. New methods and new ideas are the outgrowth of the spirit of adventure, of individual initiative and of individual enterprise. Without adventure there is no progress. No government administration can rightly take chances with taxpayers' money.

The government in commercial business does not tolerate amongst its customers the freedom of competitive reprisals to which private business is subject. Bureaucracy does not tolerate the spirit of independence; it spreads the spirit of submission into our daily life and penetrates the temper of our people not with the habit of powerful resistance to wrong but with the habit of timid acceptance of irresistible might.

Bureaucracy is ever desirous of spreading its influence and its power. You cannot extend the mastery of the government over the daily working life of a people without at the same time making it the master of the people's souls and thoughts. Every expansion of government in business means that government in order to protect itself from the political consequences of its errors and wrongs is driven irresistibly without peace to greater and greater control of the nation's press and platform. Free speech does not live many hours after free industry and free commerce die.

It is a false liberalism that interprets itself into the Government operation of commercial business. Every step of bureaucratizing of the business of our country poisons the very roots of liberalism—that is, political equality, free speech, free assembly, free press, and equality of opportunity. It is the road not to more liberty, but to less liberty. Liberalism should be found not striving to spread bureaucracy but striving to set bounds to it. True liberalism seeks all legitimate freedom first in the confident belief that without such freedom the pursuit of all other blessings and benefits is vain. That belief is the foundation of all American progress, political as well as economic.

Liberalism is a force truly of the spirit, a force proceeding

from the deep realization that economic freedom cannot be sacrificed if political freedom is to be preserved. Even if governmental conduct of business could give us more efficiency instead of less efficiency, the fundamental objection to it would remain unaltered and unabated. It would destroy political equality. It would increase rather than decrease abuse and corruption. It would stifle initiative and invention. It would undermine the development of leadership. It would cramp and cripple the mental and spiritual energies of our people. It would extinguish equality and opportunity. It would dry up the spirit of liberty and progress. For these reasons primarily it must be resisted. For a hundred and fifty years liberalism has found its true spirit in the American system, not in the European systems.

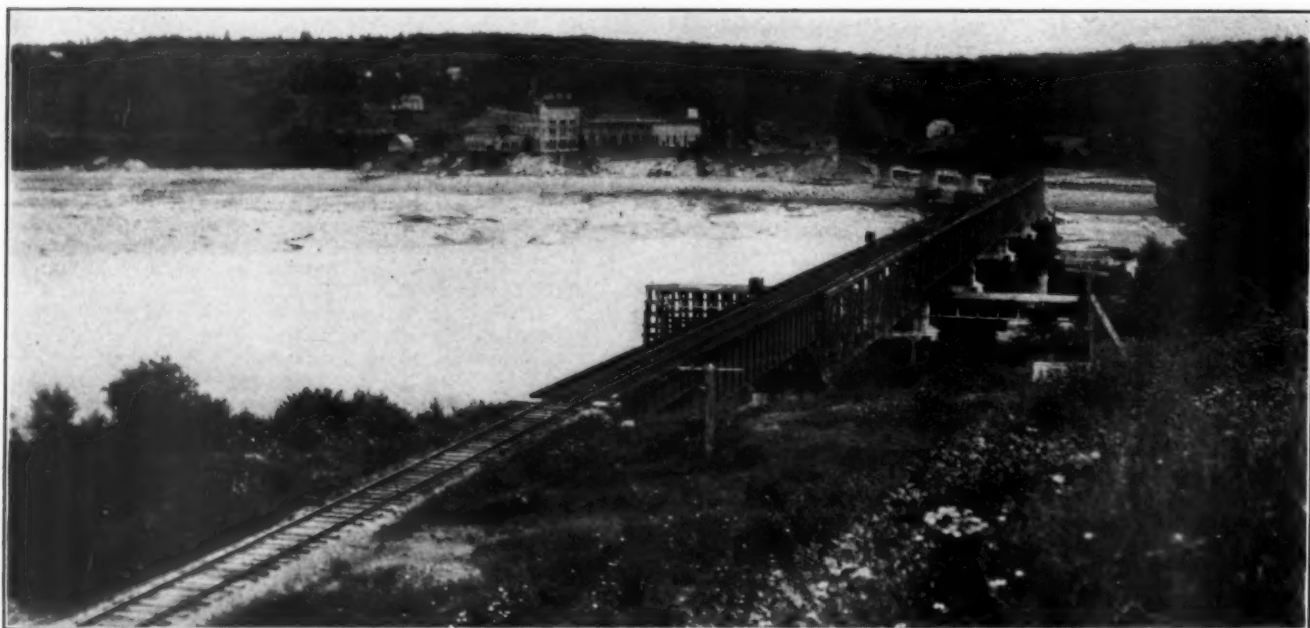
I do not wish to be misunderstood in this statement. I am defining a general policy. It does not mean that our government is to part with one iota of its national resources without complete protection to the public interest. I have already stated that where the government is engaged in public works for purposes of flood control, of navigation, of irrigation, of scientific research or national defense, or in pioneering a new art, it will at times necessarily produce power or commodities as a by-product. But they must be a by-product of the major purpose, not the major purpose itself.

Nor do I wish to be misinterpreted as believing that the United States is free-for-all and devil-take-the-hindmost. The very essence of equality of opportunity and of American individualism is that there shall be no domination by any group or combination in this Republic, whether it be business or political. On the contrary, it demands economic justice as well as political and social justice. It is no system of laissez faire.

I feel deeply on this subject because during the war I had some practical experience with governmental operation and control. I have witnessed not only at home but abroad the many failures of government in business. I have seen its tyrannies, its injustices, its destructions of self-government, its undermining of the very instincts which carry our people forward to progress. I have witnessed the lack of advance, the lowered standards of living, the depressed spirits of people working under such a system. My objection is based not upon theory or upon a failure to recognize wrong or abuse, but I know the adoption of such methods would strike at the very roots of American life and would destroy the very basis of American progress.

Our people have the right to know whether we can continue to solve our great problems without abandonment of our American system. I know we can. We have demonstrated that our system is responsive enough to meet any new and intricate development in our economic and business life. We have demonstrated that we can meet any economic problem and still maintain our democracy as master in its own house and that we can at the same time preserve equality of opportunity and individual freedom.

\* \* \* \*



On the Dominion Atlantic Near Digby, Nova Scotia



## Communications and Books

### A Censor for Conventions

TO THE EDITOR:

ST. PAUL, MINN.

I believe most of the annual conventions held by railway men are sadly in need of a tonic. Certainly, the general verdict seems to be they need something to make them different from what they are. Because of their general sameness from year to year, they are becoming deplorably tedious affairs and are developing more and more into a cliquish mutual admiration society rather than the constructive functions they are intended to be.

Those who for years have been attending these meetings could write a fairly accurate account of what the actual proceedings were without ever being present, including the lengthy eulogistic remarks of the chairman upon his able vice-chairman, secretary and various committee chairmen, and with remarkable accuracy could pen the compliments this corps of assistants used in responding. But the most tiresome thing is the useless harping upon moss-covered subjects which speakers present with endless loquacity and irrelevancy without advancing a single new idea.

Numerous committees are appointed to cover the organization's various activities, but I have never known of a censoring committee to be created, which I believe could remedy much of what is now wrong with these conventions, by having the delegated power to delete all the "blah" and other irrelevancies which now so often form the major portion of the remarks of the scheduled speakers. Not only would much time be saved, but the interest that the present inefficiencies destroy, would be thus revived and our conventions made worth while.

A CONVENTION ATTENDER.

### New Books

*Scientific Purchasing*, by Edward T. Gushee and L. F. Boffey. 196 pages, 5¾ in. by 9 in., bound in cloth. Published by McGraw-Hill Book Company, Inc., 370 Seventh avenue, New York. Price \$3.

The authors of the book are, respectively, the purchasing agent of the Detroit Edison Company, and the editor of *The Purchasing Agent*. The book is the first edition of the authors' discussion of purchasing, and comprises one of the few treatises which have been published on the subject. The intention throughout the book is to indicate the foundation for successful purchase routine in industry. In an introductory paragraph to the book, Alex Dow, president of the Detroit Edison Company and of the American Society of Mechanical Engineers, terms it a text book of fair dealing between the buyer and seller. It is essentially a book outlining, from the viewpoint of the authors, the principles and methods of handling and storing materials. The first part of the book deals with the principles of scientific purchasing, having chapters on the principles of centralization, personnel, standards and specifications and fair dealing, while the second part of the book, dealing with methods, contains chapters as follows: Specifications; economic aspects; quality and quantity; invoice handling; storing and traffic; purchase procedure.

*One Hundred Years of American Railroading*, by John W. Starr, Jr., 336 pages, 5½ in. by 8 in., bound in cloth. Illustrated. Published by Dodd, Mead & Company, Inc., New York. Price \$3.50

This new book by the author of "Lincoln and the Railroads" is a fascinating account of early American railway promotions which, during the course of the past century, have evolved to become the extensive transportation systems of the country

today. Beginning with a brief outline history of locomotive development, with particular reference to the types and individual machines in early use, the book continues to sketch, also, the initial experiments in roadbed and rail construction which eventually led to the adoption of present types with the standard gage. In succeeding chapters the beginnings of each great system of today are considered separately, the author in each case supplying an interesting account of the agitation, construction problems and opening ceremonies of the original line which finally became the powerful system. Not only has Mr. Starr written an historical book, but his selection and presentation of material has been so choice that many unusual and entertaining excerpts from railway writings and speeches of the period under review have been included to amuse the reader with interesting sidelights. Closing chapters discuss the evolution of the sleeping car and other modern passenger train equipment, the modern locomotive, safety appliance developments and, finally, there are included the views of several contemporary railway executives on the future of American railroading. Included also are several well-selected illustrations.

*Principles of Transportation*, by Emory R. Johnson, Grover C. Huebner and G. Lloyd Wilson, 815 pages, 8½ in. by 5½ in. Published by D. Appleton and Company, New York. Price \$5.

The three authors here collaborate in the presentation of a comprehensive treatise on all types of transportation and thus bring to the reader in one volume a discussion of rail, water, highway and air carrier services. While a proper co-ordination of these several agencies is not regarded by the authors to be in immediate prospect they nevertheless predict in their introduction that, "The day is coming when each home, whether it be in the city or country, will be connected by organized transportation directly with other homes in all parts of the land, each farm and factory with other farms and factories. Society will be made a unit by a universal transportation system. This will come about by the development now in progress of all agencies of carriage, carriers by rail, highway, air and water and their systematic co-ordination into a unified system of transportation. The goal is not to be immediately attained but it is one ever to be kept in mind in developing carrier facilities and in legislation and administrative action affecting their interrelations."

Approximately half of the book is devoted to a discussion of railways, considering, in separate sections, railroad services, business methods and organization, rates and government regulation. This railway discussion is especially comprehensive in its presentation of detail in connection with types of equipment and service, functions of specific employees, rate classifications, rate making policies and governmental regulatory practice.

The section devoted to motor and highway transportation considers the development of the different classes of these road services, the development of independent non-railroad freight and passenger operations and rate policies. Co-ordination of rail and motor services in terminal areas is advocated along with an explanation of such operations at St. Louis and Cincinnati. The establishment of concentration points for line haul co-ordination, to eliminate l.c.l. collection and peddling by local freight trains is next proposed. Attention is also given store door collection and delivery in which connection a tariff provision is suggested to enable railway patrons voluntarily to avail themselves of this service. Motor coach and passenger train co-ordination is given a chapter, as is the place of the highway vehicle in electric street railway operation, while a third is devoted to the co-ordination of steamship and highway transport.

The section closes with a survey of common carrier motor

vehicle regulation by municipalities and states and pending proposals for federal regulation.

Like the railway section, the section on transportation by water is a detailed discussion of ocean, coastwise and inland water carrier organization, services, rates and regulation by governmental agencies. Included also is a discussion of various governmental merchant marine policies and subsidies as compared with the American merchant marine and shipping policy.

Air transportation is discussed in the concluding section. Here is briefly reported the evolution of this latest mode of transportation, the development of airways and commercial service in Europe and America, and the progress of air mail services in the United States. The final chapter is a discussion of the Air Commerce Act of 1926 with closing comment on the development of regulation abroad and international airway control.

## Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,  
Bureau of Railway Economics, Washington, D. C.)

### Books and Pamphlets

*New England Flood of November, 1927.* Bulletin No. 308, American Railway Engineering Association. Causes of flood, railroads affected, path of storm, summary of loss and damage. Illustrated. 112 p. Pub. by American Railway Engineering Association, Chicago, Ill., \$1.

*State Taxation of Railways in the United States*, by Hsien-Ju Huang. Discusses development of railway taxation, "property as a criterion: the *ad valorem* system," "property as a criterion: the capitalization system," "income as a criterion: taxation of earnings." Part II takes up theories of railway taxation. 209 p. Pub. by Columbia University Press, New York City.

*Posters and Publicity, Fine Printing and Design, 1928 Annual of Commercial Art.* Posters of the following railways are included: Austrian Federal, Chikuba Ry. Bureau, Great Western [of Gt. Brit.], London, Midland & Scottish, London & North Eastern, London's Underground, Nagoya Ry. Bureau, Norwegian State Railways, Paris-Lyon-Mediterranée, Sendai Ry. Bureau, Southern Ry. [Gt. Brit.], Tokyo Ry. Bureau. The use of railway and transport subjects in posters by commercial firms generally is interesting and apparently increasing. Indexed by Advertisers, Designers, Printers, and Agents. 162 p. Pub. by Wm. Edwin Rudge, New York City. \$3.

### Periodical Articles

*Electric Transportation—Annual Report of Committee on Transportation, American Institute of Electrical Engineers.* "Steam railroad electrification" 1927 and recent developments. Journal of the A.I.E.E., October, 1928, p. 741-743.

*Airways and Railways*, by Air Vice-Marshal Sir W. Sefton Brancker. Editorial comment, p. 2. Takes up railway and airway history, long distance routes, air services for railways, combined rail and air services, costs of operation, and speed. Modern Transport, October 13, 1928, p. 3-4.

*Our Conquest of the Pacific*, by Charles E. Kingsford-Smith and Charles T. P. Ulm. Narrative of the 7,400-mile Trans-Pacific flight in the "Southern Cross"—San Francisco to Brisbane, Australia, in 83 hours fifteen minutes total flying time. Illustrated. National Geographic Magazine, October, 1928, p. 371-402.

*Where Do Good Locomotives Go When They Die?* by Robert Niles, Jr. With particular reference to the "John Lucas" built for the Camden & Atlantic in 1878, and discovered in a Dutch Guiana jungle in 1927. Pictures illustrating this article are noteworthy. Baldwin Locomotives, October 1928, cover and p. 2-6.

*The End of the Trail*, by R. A. Martin. "This year will probably end the existence of one of the most famous trails in the New World, the trail from the Pacific to Bogotá in Colombia . . . Little by little . . . the railroad has been nibbling at both ends . . . Now the trying journey of ten days . . . has become 12 hours by train." p. 1019. Illustrated. Bulletin of the Pan American Union, October, 1928, p. 1017-1026.

## Looking Backward

### Fifty Years Ago

The Baltimore & Ohio has completed a successful experiment with a device installed in the smoke box which arrests the sparks and cinders and prevents their going up the stack. The stack used on this locomotive has straight sides and has a small diameter.—*Railway Age*, October 24, 1878.

The statistics of those American trunk lines for which complete figures are available show that the New York Central, the Erie and the Pennsylvania increased their gross ton-miles handled from 3,695,300,000 in 1873 to 4,229,300,000 in 1877 or 14.4 per cent. The New York Central increased its gross ton-mileage 27 per cent and the Grand Trunk ton-mileage increased 82.4 per cent during the same time. On the Michigan Central gross ton-miles have increased 96.5 per cent from 1873 to 1877 while the Pittsburgh, Ft. Wayne & Chicago [now part of the Pennsylvania] shows a decrease of 7.4 per cent.—*Railroad Gazette*, October 25, 1878.

In reply to a criticism of his management of the Grand Trunk and the proposal that the through traffic be abandoned as unprofitable and that the superfluous rolling stock be rented, Sir Henry W. Tyler, president, has issued a statement calling attention to the fact that even though earnings per ton-mile have decreased from 1.38 cents in 1872 to 0.80 cents in 1877, the ton-miles handled have increased enough to produce increased total revenue. He states that if the through traffic had been given up not enough revenue could have been derived from local traffic to keep the railroad from a position of serious embarrassment.—*Railroad Gazette*, October 25, 1878.

### Twenty-Five Years Ago

Howard Elliott, second vice-president of the Chicago, Burlington & Quincy, was on October 21 chosen president of the Northern Pacific.—*Railway and Engineering Review*, October 24, 1903.

The Chicago Great Western has announced that through service between Omaha, Neb., and St. Paul-Minneapolis, Minn., will be inaugurated on November 1 and that through service between Omaha and Chicago will be started on November 15.—*Railway Age*, October 30, 1903.

The Pennsylvania project to construct a tunnel under Bergen Hills, the Hudson river, Manhattan island, East river and Long Island City, will involve a more highly concentrated expenditure of money than has ever before been attempted in the United States. Present estimates show that more than \$40,000,000 will be spent on a line 6 miles long.—*Railway Age*, October 30, 1903.

### Ten Years Ago

The Railroad Administration has ordered for 1919 delivery 600 locomotives in addition to 1,415 which it has already ordered. These will include 150 eight-wheel switchers, 300 Mikados, 25 Santa Fe, 50 six-wheel switchers and 75 Mallet.—*Railway Age*, October 25, 1918.

Incomplete returns to the Director-General on October 21 show that the railway men of the country subscribed \$164,992,000 to the Fourth Liberty Loan as compared with \$106,655,000 to the Third Loan. The average subscription was more than \$100.—*Railway Age*, October 25, 1918.

Director General McAdoo, on October 22, affixed his signature to the first of the contracts with the railroads for their compensation during federal control, based on the standard return as certified by the Interstate Commerce Commission. This contract was with the Chicago & North Western and its subsidiaries, providing for annual compensation of \$23,364,028.—*Railway Age*, October 25, 1918.



## Odds and Ends of Railroading

For peculiar railway names, the prize must be awarded to the Swansea & Mumbles Railway Company of England, which is the successor to the Oystermouth Railway Company.

The post of assistant attorney for the Union Pacific in Kansas and Missouri has proved a stepping stone to higher places. Benjamin W. Scandrett, who has been appointed vice-president of the Northern Pacific, occupied that position at Topeka, Kan., from 1908 to 1913 while his brother, Henry A., president of the Chicago, Milwaukee, St. Paul & Pacific, was assistant attorney at Topeka from 1901 to 1911.

It has been said that there is nothing new under the sun, but a recent item in the Railway Gazette (London) which has an appearance of novelty, is to the effect that the line of the Great Southern Railways of Ireland, extending from Dublin on the east coast across to Galway on the west coast, 126 miles long, now double track, is to be made single track; and the same treatment is to be given to the branch between Mullingar and Longford, 26 miles; also two other branches, aggregating about 36 miles in length.

### Engineman Emulates Orpheus

Engineman Arthur W. Doble of the Chicago, Milwaukee, St. Paul & Pacific has a most unusual avocation. In his leisure moments, he plays the musical saw, hammering out jazz, popular or classical music as the spirit moves him. His regular broadcasting engagements at Spokane, Wash., radio stations are looked forward to in that section of the country. Doble claims to be the only musical saw expert employed by the railroads.

### Shops on a Boulevard

Most railway shops are situated in rather inaccessible spots, so far as reaching them by automobile or street car is concerned. This is not the case at the 55th Street shops of the Pennsylvania in Chicago. Here both the shops and the engine-house front directly on Garfield boulevard, a well-traveled arterial highway, which, with this exception, is almost exclusively a residential street. Is this the only railway shop on a boulevard?

### Autos Popular in Texas

Investments in automobiles in Texas exceed those in railroads by more than \$250,000, according to O. H. Bower, auditor for the Missouri-Kansas-Texas. The automobile investment is computed on a retail basis and obtained from figures found in the 1928 yearbook of the National Automobile Chamber of Commerce. The investment for motor vehicles alone in Texas, according to the 1927 registration, is estimated at \$1,017,767,310. This estimate does not include money invested in highways.

### Travels 326 Miles to Sunday School

Observance of Sunday to Edward W. Ireland, laborer on the New York division of the Pennsylvania, means a week end round-trip totaling 326 miles from his Trenton, N. J. home to Washington, D. C., where he regularly attends a Sunday school class which he joined several years ago. His journey to this distant Sunday school followed upon the kindly solicitations of a gentleman in the Washington church as Mr. Ireland sought information when he was unable to find his way back to the railroad station on the occasion of his first trip to the Capital in 1918. After he received proper directions, Mr. Ireland, being a Bible student, accepted an invitation to remain for the Bible instruction. He did, and went back to Washington the next Sunday, and the next one, and has continued to do so for nearly 520 Sundays, absenting himself only on account of illness.

### Hates Railroad Trains—Spends

#### \$250 for Taxicab Ride

On receiving word that his sister had died in Atlanta, Ga., Olin P. Drake, a Newark, N. J., barber, hailed a taxicab at Tenth street and Eighteenth avenue, New York and told the chauffeur to drive him to Atlanta. Notified by the driver, officials of the taxi company plotted the route and fixed the cost at \$250, plus the drivers' expenses. Considering the fact that he could have made the 852-mile trip by rail for \$31.11, his hatred of railroads must be intense. He should apply for a job in the barber shop in the Capitol building at Washington, D. C. There are quite a few congressmen with whom he would be immensely popular.

### If There Were Only More People Like This!

Sittin' on the platform,  
Lookin' at the rails;  
Thinkin' o' the many  
Different kind o' trails.  
Dusty yellow roadways  
Leadin' over hills;  
Narrow, tangled pathways  
'Side o' sparklin' rills.  
City streets and highways,  
Lanes through quiet vales—  
But I get my big thrill  
Ridin' on the rails.

—Chicago Daily News

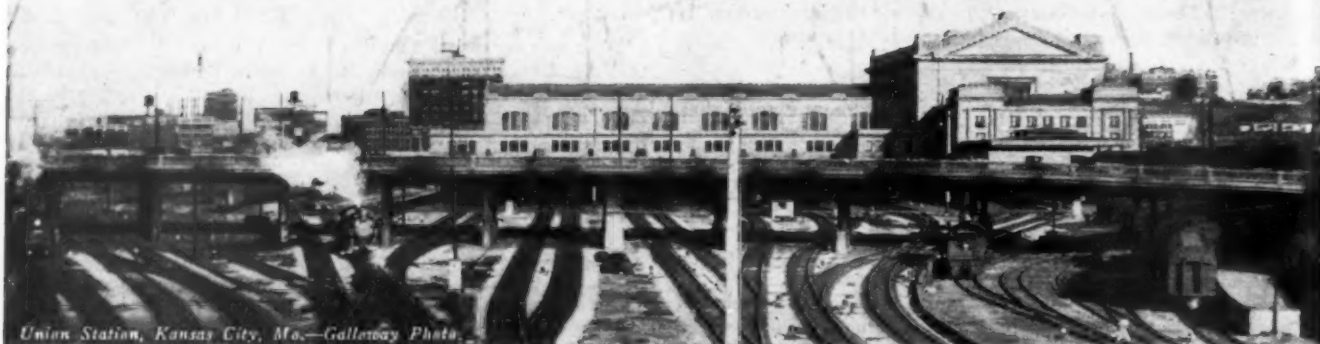
### The Brakeman-Trouper

Preferring a career with the New York Central as a brakeman to the endless tramping of vaudeville, Arthur J. French, known as "Brando, The Challenge Handcuff King and Jail Breaker," bade goodbye to the footlights and became a member of the crew of the Southwestern Limited. In his repertoire, Brando, as he is called, has an unlimited number of escape tricks, many of them of the most difficult nature. Yet he does them with ease and grace. He escapes from handcuffs, mail-bags, rope chairs, packing cases, coffins, band-boxes, iron bottles, iron boilers, iron boxes, tramp chairs, paper bags and straight-jackets. Besides these he has the usual bag of tricks of all artists in this line, such as coin tricks, card tricks and sleight-of-hand tricks, that are done with the finesse of the late Houdini.

### The Milwaukee Should Have Sued Him for Sleeping in a Day Coach

For a long time it has been an accepted fact that western railroads provide a maximum of service to passengers on local trains. But some western railroads are woefully remiss in this respect. As an example, Clyde Vanderbick of Sioux City, Iowa, boarded a Milwaukee train last Summer on the assumption that he was entitled to a destination-prodding service, in spite of the fact that nowhere in its advertising does the Milwaukee agree to wake the passenger when it is time for him to leave the train. He fell asleep between Yankton, S. D., and Vermilion and was carried beyond his station. In walking back Mr. Vanderbick injured a leg, he told the district court at Sioux City, to the extent of \$2,700, a misfortune which he no doubt attributed to the failure of the Milwaukee's passenger-waking service. Judge A. O. Wakefield ruled on October 4 that train employees are not obligated to awaken passengers who fall asleep in day coaches when nearing destinations, and are not liable to damages if loss results to the passenger. Perhaps the trainmen, in allowing Mr. Vanderbick to sleep, were merely following the general rule "K" of the standard code which states: "Employees and others authorized to transact business at stations on or about trains must be orderly and avoid annoyance to passengers."

# NEWS of the WEEK



Union Station, Kansas City, Mo.—Gallows Photo.

THE NEW ENGLAND RAILROAD CLUB will hold its next meeting at the Copley-Plaza Hotel, Boston, on Tuesday evening, November 13, with a paper on the marine activities of the Canadian Pacific, by H. B. Beaumont.

THE MILWAUKEE.—Because of the length of the name of the Chicago, Milwaukee, St. Paul & Pacific, this company has adopted the name "Milwaukee" as the standard title of the road and is painting it on the sides of coaches and freight cars.

BLACKBURN ESTERLINE, assistant to the solicitor general of the United States, who for several years has represented the Government in court litigation affecting the Interstate Commerce Commission, was killed on October 21 by falling down an elevator shaft in the office of the Department of Justice at Washington.

THE CANADIAN RAILWAY CLUB will hold its next meeting at the Windsor Hotel, Montreal, on Tuesday evening, November 13, with a paper by D. Irish, of the Foster-Wheeler Company, New York, on the use of pulverized fuel in power plants. Beginning with the December meeting, this club will meet on Monday evening instead of on Tuesday.

THE MOFFAT TUNNEL COMMISSION has withdrawn the \$130,000 suit which it filed against the Denver & Salt Lake for rental on the Moffat-Evans tunnel. The commission claimed the railroad should pay rent from February 14 but the road contended that the tunnel was not completed at that date and tendered a check for what it claimed actually was due. The commission had refused the offer and filed its suit in the district court and later transferred action to the federal court.

THE PENNSYLVANIA CHAMPION BASEBALL TEAM defeated the Missouri Pacific champion baseball team in a one-game "world's series" for the championship of the World's Railroad Baseball League, on October 20 at East St. Louis, with a score of 15 to 5, before an audience of 8,000

people. The team representing the Pennsylvania was the Philadelphia Terminal nine, while that representing the Missouri Pacific came from De Quincy, La. These teams were selected by an elimination series on each road. The Pennsylvania won the championship, last year having defeated the New York Central 1 to 0.

A TRAINING SCHOOL and dietetical kitchen for dining-car stewards, cooks and waiters, has been established by the Pennsylvania at Sunnyside Yard, Long Island City, the eastern headquarters of the road's dining car department; and the company now has three schools of this kind, the other two being at Columbus, Ohio, and Chicago. The first school was that at Columbus, which was opened last year. These schools not only educate new employees but give instruction regularly to the men now in service. These employees are brought into the school immediately upon returning from road trips and each individual spends approximately three hours a week at school.

EMPLOYEES OF THE AMERICAN RAILWAY EXPRESS, who on October 8 struck and caused a suspension of traffic to and from New York City for two days, were reported last week as being again threatening disturbance; but on Monday, October 22, they announced that all differences between the American Railway Express and the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees had been settled. The announcement, given out jointly by the clerks and the Express Company, said that a satisfactory basis had been reached through negotiations participated in by George A. Cook of the United States Board of Mediation.

## Dinner to Chesapeake & Ohio Shopmen

The officers and workmen, over 800 in all, employed in the Seventeenth street shops of the Chesapeake & Ohio, Richmond, Va., were entertained at dinner by the railway company on Wednesday evening, October 17, with officers of the

road, representatives of the Travelers' Insurance Company and of the Richmond Safety Council in attendance; the occasion being the celebration of the success of the Seventeenth street shops in a safety contest among industrial concerns in Richmond, covering one year, ending August 31, last, in which contest these shops were awarded a beautiful silver loving cup which had been given by the Travelers' Insurance Company. The contest was participated in by a great variety of industries. The railway shopmen, who had worked 2,003,506 hours during the year, came off with only 16 lost-time accidents or 7.94 per million man hours worked.

## Southern Clerks in Atlanta

The thousand or more clerks of the Southern Railway who have lately removed from Washington, D. C., to Atlanta, Ga., seem to be very fully appreciated in the last-named city. As noted in the *Railway Age* of October 6, several hundred of these clerks and their families traveled from Washington to Atlanta the last week in September in special trains, arriving there in a body early in the forenoon. They were welcomed to the city by a large committee, in which were the Mayor and representatives of the Board of Trade, and free automobiles were provided to take each family to its new home, all or most of the newcomers having engaged their houses prior to the date of arrival.

And now we read that on Monday evening of this week, an entertainment with a dance, was given in honor of the new citizens at the Ansley Hotel. Free tickets of admission were given out generally to railway and express clerks. Among the speakers at the entertainment were Hon. I. N. Ragsdale, Mayor of the city, and J. M. Harrison, president of the clerks' brotherhood.

## Lipetz Lectures at Purdue

The series of lectures on Locomotive Engineering to be given by Alphonse I. Lipetz, consulting engineer of the American Locomotive Company at Purdue Uni-



versity, West Lafayette, Ind., will open at 6 p. m., Monday, October 29, in the Memorial Union building, with an informal discussion of railway conditions and engineering education in Europe. Mr. Lipetz, who is also a non-resident professor of locomotive engineering, will then continue his lectures in the halls of the engineering buildings. Details of the program follow.

Tuesday, October 30

- 1 p.m.—Traction Problems. Time-Speed-Distance Curves. (Of interest to all engineering students.)  
7 p.m.—Oil-Engine Locomotives. (Address before joint meeting of Pur-

due student branches of national engineering societies and others interested in railway problems.)

Wednesday, October 31

- 10 a.m.—Conferences with students and others interested in railway problems.  
3 p.m.—The Action of Locomotive Wheels on Rails.

Thursday, November 1

- 1 p.m.—Distribution of Power in Locomotives.  
7 p.m.—Design of the Modern Locomotive.

Friday, November 2

- 10 a.m.—Informal discussion with stu-

dents and others interested in railway problems.

- 1 p.m.—Theory of Mechanisms — Informal meeting with students, staff and others interested.

### Crossing Elimination in New York

Grade crossing elimination in New York State under the provisions of the \$300,000,000 bond law has now progressed to a point where definite results are evident. Records of the Engineering Division of the Department of Public Works show that since this law went

(Continued on page 826)

## Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 185 Steam Railways, Including 16 Switching and Terminal Companies.

FOR THE MONTH OF AUGUST, 1928 AND 1927

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Average number of miles operated .....	240,631.11	239,453.36	59,355.69	59,444.88	5,631.35	5,617.85	40,182.56	39,822.14	135,461.51	134,568.49
Revenues:										
Freight .....	\$421,006,706	\$415,346,693	\$177,531,688	\$178,594,281	\$20,083,216	\$22,253,592	\$49,392,043	\$52,221,276	\$173,999,759	\$162,277,544
Passenger .....	485,101,543	491,703,557	45,890,785	48,750,639	1,499,436	1,781,735	9,106,140	10,387,055	28,605,182	30,784,128
Mail .....	8,848,023	7,658,421	3,486,360	2,928,067	206,054	199,120	1,297,024	1,121,216	3,858,585	3,410,018
Express .....	11,420,592	11,876,967	5,234,738	5,821,632	225,350	289,480	1,107,836	1,340,934	4,852,668	4,424,921
All other transportation .....	18,627,524	18,357,947	10,659,337	10,303,036	208,237	217,947	971,076	987,317	6,788,874	6,849,627
Incidental .....	12,046,867	12,053,858	5,897,398	5,765,963	269,632	355,402	932,641	1,026,029	4,947,196	4,906,464
Joint facility—Cr. ....	1,090,780	1,183,162	422,375	491,089	16,275	21,848	151,362	139,195	500,768	531,030
Joint facility—Dr. ....	286,480	406,442	76,704	126,886	3,924	2,525	31,270	43,227	174,582	233,804
Ry. operat'g revenues .....	557,855,555	557,774,163	249,045,977	252,527,841	22,504,276	25,116,599	62,926,852	67,179,795	223,378,450	212,949,928
Expenses:										
Maintenance of way and structures .....	76,890,498	80,310,327	33,324,828	34,156,352	3,051,800	3,215,945	9,585,130	10,000,460	30,928,740	32,937,570
Mainten'ce of equip'm't .....	99,457,172	102,983,587	46,058,410	48,561,089	4,515,609	4,893,258	12,646,627	13,444,145	36,236,526	36,085,095
Traffic .....	10,298,338	9,955,982	3,875,449	3,855,888	282,739	263,266	1,712,301	1,663,549	4,427,849	4,173,279
Transportation .....	177,686,104	180,866,397	82,167,143	84,992,979	5,595,834	6,206,684	21,833,073	23,100,641	68,090,054	66,566,093
Miscellaneous operat'ns .....	5,074,834	5,117,027	2,262,272	2,247,231	72,620	77,904	403,097	430,005	2,336,845	2,361,887
General .....	15,941,669	16,111,883	7,171,250	7,393,932	566,797	575,220	2,113,238	2,089,972	6,090,384	6,052,759
Transportation for investment—Cr. ....	1,440,840	1,785,993	308,145	310,028	31,390	58,567	82,959	85,395	1,018,346	1,332,003
Ry. operat'g expenses .....	383,907,775	393,559,210	174,551,207	180,897,443	14,054,009	15,173,710	48,210,507	50,643,377	147,092,052	146,844,680
Net revenue from railway operations .....	173,947,780	164,214,953	74,494,770	71,630,398	8,450,267	9,942,889	14,716,345	16,536,418	76,286,398	66,105,248
Railway tax accruals .....	35,209,727	35,402,706	15,417,539	15,212,229	1,571,534	1,815,491	4,105,031	4,463,008	14,115,623	13,911,978
Uncollectible ry. rev's .....	93,314	90,340	45,544	23,723	1,851	7,817	17,653	14,928	28,266	43,872
Ry. operating income .....	138,644,739	128,721,907	59,031,687	56,394,446	6,876,882	8,119,581	10,593,661	12,058,482	62,142,509	52,149,398
Equip't rents—Dr. bal. ....	8,169,166	7,862,490	4,019,191	3,732,858	6,870,755	4,451,754	455,931	412,722	4,836,661	4,704,108
Joint facility rent—Dr. balance .....	2,061,439	2,057,854	1,116,106	1,037,561	96,351	90,961	75,397	96,586	773,585	832,746
Net railway operating income .....	128,414,134	118,801,563	53,896,390	51,624,027	7,411,286	8,480,374	10,574,195	12,084,618	56,532,263	46,612,544
Ratio of expenses to revenues (per cent) ...	68.82	70.56	70.09	71.63	62.45	60.41	76.61	75.38	65.85	68.96

FOR EIGHT MONTHS ENDED WITH AUGUST, 1928 AND 1927

Average number of miles operated .....	240,203.36	239,154.35	59,337.87	59,443.45	5,625.16	5,616.90	40,095.46	39,694.88	135,144.87	134,399.12
Revenues:										
Freight .....	2,991,672,761	3,049,747,453	1,296,087,051	1,354,682,593	148,783,934	167,155,077	394,539,519	418,916,956	1,152,262,257	1,108,992,827
Passenger .....	609,292,545	662,197,754	318,009,829	338,867,535	11,488,642	13,793,411	77,981,070	87,845,345	201,813,004	221,691,463
Mail .....	64,286,488	62,498,606	24,507,562	23,820,483	1,670,039	1,624,848	9,520,507	9,299,598	28,588,380	27,753,677
Express .....	88,911,120	88,699,464	40,689,201	41,348,225	1,950,847	2,020,239	11,418,986	11,803,846	34,852,086	33,527,154
All other transportation .....	136,685,121	138,068,398	77,272,776	77,460,919	1,546,173	1,680,084	7,961,568	8,548,916	49,904,604	50,378,479
Incidental .....	81,289,961	85,621,239	40,647,123	42,645,437	2,412,780	3,133,290	8,712,180	9,304,896	29,517,878	30,537,616
Joint facility—Cr. ....	8,910,968	9,239,789	3,484,384	3,701,631	102,246	123,561	1,167,990	1,343,758	4,156,348	4,070,839
Joint facility—Dr. ....	2,923,020	3,357,028	1,005,358	1,073,194	33,884	18,810	244,599	277,005	1,639,179	1,988,019
Ry. operat'g revenues .....	3,978,125,944	4,092,715,675	1,799,692,568	1,881,453,629	167,920,777	189,511,700	511,057,221	546,786,310	1,499,455,378	1,474,964,036
Expenses:										
Maintenance of way and structures .....	562,896,829	585,950,186	231,430,172	242,344,536	24,380,966	25,937,763	74,114,400	80,748,230	232,971,291	236,919,657
Mainten'ce of equip'm't .....	781,834,848	825,184,578	364,030,837	392,509,209	35,857,484	39,969,867	103,968,976	109,275,933	277,977,551	283,429,569
Traffic .....	83,795,901	80,582,807	31,066,457	29,769,079	2,157,390	2,111,650	14,003,224	13,961,151	36,568,830	34,740,927
Transportation .....	1,380,610,490	1,440,882,651	646,912,609	686,232,877	44,414,593	49,439,652	179,873,929	192,989,848	509,409,359	512,220,274
Miscellaneous operat'ns .....	37,396,305	37,613,969	17,307,701	17,341,189	648,992	680,796	4,101,590	4,231,406	15,338,022	15,360,578
General .....	128,971,098	128,288,124	57,612,905	58,291,907	4,844,936	4,526,543	16,775,280	16,805,235	49,737,977	48,664,439
Transportation for investment—Cr. ....	10,109,773	10,197,497	1,677,442	1,825,157	234,398	343,065	643,314	989,242	7,554,619	7,040,033
Ry. operat'g expenses .....	2,965,395,698	3,088,304,818	1,346,683,239	1,424,663,640	112,069,963	122,323,206	392,194,085	417,022,561	1,114,448,411	1,124,295,411
Net revenue from railway operations .....	1,012,730,246	1,004,410,857	453,009,329	456,789,989	55,850,814	67,188,494	118,863,136	129,763,749	385,006,967	350,668,625
Railway tax accruals .....	249,711,549	252,109,084	104,647,699	104,162,541	13,074,455	14,251,467	32,964,826	33,475,848	99,024,569	100,219,238
Uncollectible ry. rev's .....	859,592	985,592	431,584	388,024	13,505	39,441	133,708	161,845	280,705	396,282
Ry. operating income .....	762,159,195	751,316,181	347,930,046	352,239,434	42,762,854	52,897,586	85,764,602	96,126,056	285,701,693	250,053,105
Equip't rents—Dr. bal. ....	60,308,194	57,867,196	32,426,688	31,643,755	4,265,059	43,801,333	3,953,001	4,786,700	28,193,564	25,238,074
Joint facility rent—Dr. balance .....	16,198,988	16,584,324	8,242,931	8,062,585	863,936	802,578	566,516	864,509	6,525,605	6,854,652
Net railway operating income .....	685,652,013	676,864,661	307,260,427	312,533,094	46,163,977	55,896,341	81,245,085	90,474,847	250,982,524	217,960,379
Ratio of expenses to revenues (per cent) ...	74.54	75.46	74.83	75.72	66.74	64.55	76.74	76.27	74.32	76.23

<sup>a</sup> Includes \$3,797,395 sleeping and parlor car surcharge. <sup>b</sup> Includes \$3,717,365 sleeping and parlor car surcharge. <sup>c</sup> Includes \$26,623,476 sleeping and parlor car surcharge. <sup>d</sup> Deficit or other reverse items. <sup>e</sup> Includes \$26,977,386 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

## News of the Week

(Continued from page 825)

into effect, the Public Service Commission which has jurisdiction over grade crossings outside of Greater New York has ordered 234 eliminations at an estimated cost of \$27,200,000.

In 1928 the law was amended so that the state pays 40 instead of 25 per cent of the cost and the municipality 10 instead of 25 per cent as formerly, with the percentage to be paid by the railroad company remaining the same, 50 per cent. Under the 1928 law, the Public Service Commission has ordered to date 43 eliminations, to cost \$7,125,000.

Thirty-six contracts are actually under way involving about \$2,000,000, and the commission each week is adding to the list of orders and approving low bids for construction work of jobs previously ordered.

The legislature has appropriated \$60,000,000 for eliminations outside of Greater New York and \$10,000,000 worth of bonds have been sold. Further bonds will be sold as needed. To date there has actually been paid out of the state treasury towards the cost of grade crossing elimination under this law, \$765,876.

### Railroad Division, A. S. M. E., Sponsoring National Meeting

The Executive Committee of the Railroad Division, American Society of Mechanical Engineers, is completing arrangements for the co-ordination of the complete program of the annual winter meeting of the society, which is to be held in the Engineering Societies Building, 20

West Thirty-Ninth street, New York, December 3-7, so as to afford the railway mechanical engineer employed in the railroad or railway supply industries, all the advantages of a national division meeting. This procedure, instead of having a separate national Railroad Division meeting, extending over a period of several days was adopted due to the fact that there are already a considerable number of associations that hold conventions during the year and the Executive Committee, Railroad Division, did not consider it advisable to add another. Instead, it is taking advantage of the papers and reports being presented by other professional divisions at this meeting and together with its own two-sessions program of four papers, it has developed a program for the railway mechanical engineer which extends over the entire five-day period.

The annual winter meeting of the A.S.M.E. has been an established feature of the society for many years. In addition to the technical program, the National Exposition of Power and Mechanical Engineering will be held at the Grand Central Palace, New York. The seventh exposition which is to be held December 3 to 8, 1928, inclusive, will have a large display of the latest developments in power plant, heating and ventilating and other mechanical equipment. The program has been arranged so as to afford a minimum of conflict between meetings in which the railway mechanical engineer may be interested.

The following is the consolidated program that has been planned by the Executive Committee of the Railroad Division:

#### MONDAY, DECEMBER 3

Fixture design: principles of jig and fixture practice, by Jos. W. Roe  
Open house

#### TUESDAY, DECEMBER 4

Methods of motor application and controls on lathes, by C. L. Cameron  
Motors for planer service, by Forrest E. Cardullo  
Motor drives for precision grinding, by R. E. W. Harrison  
Application of motors to special drilling and tapping machinery, by J. H. Mansfield  
Balancing heat and power in industrial plants, by Robert V. Kleinschmidt  
Material handling problems in the public utility, by John C. Somers

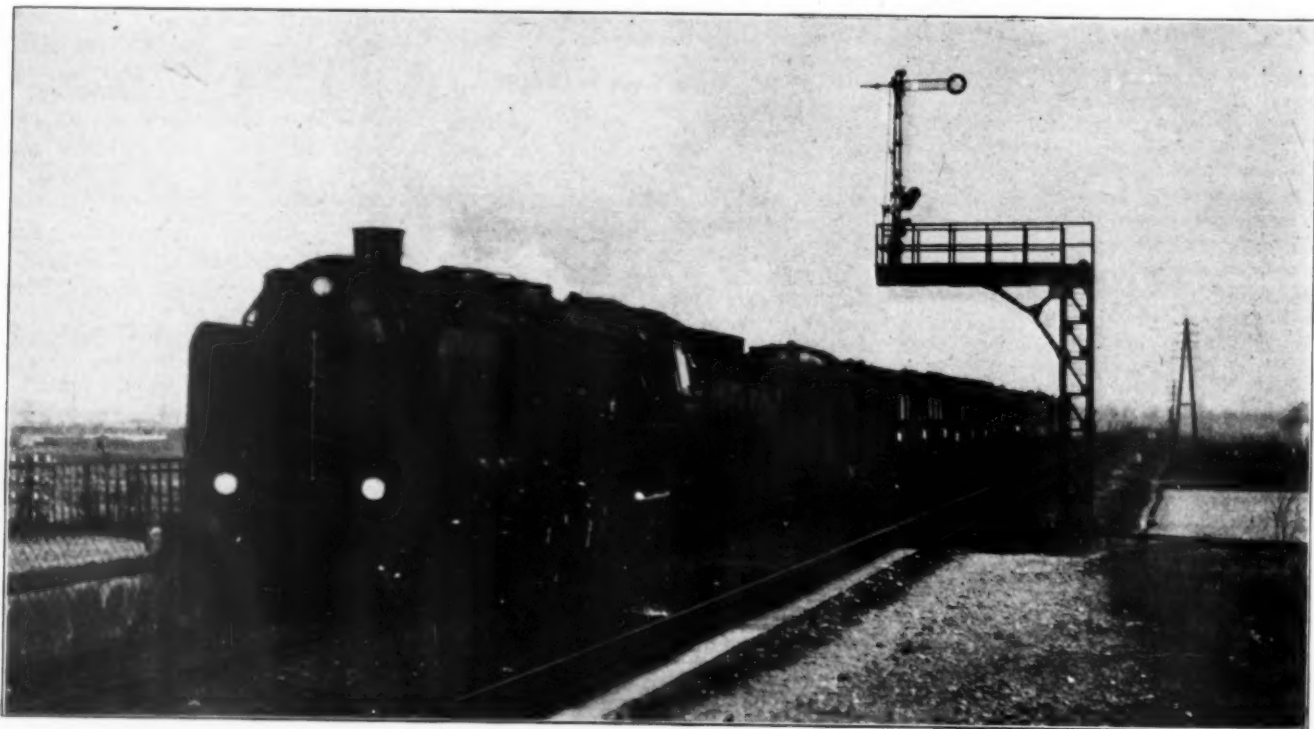
#### WEDNESDAY, DECEMBER 5

Coal pulverizers, by W. J. A. London  
Analysis of oil-engine performance with a view to rating, by Otto Nonnenbruch  
Refrigeration in railroad freight cars, by J. W. Martin, Jr.  
Characteristics of injectors with special reference to their utility as locomotive feedwater heaters, by R. M. Ostermann  
Designing buildings for daylight, by H. H. Highbie and W. C. Randall  
Artificial lighting provision in building design and process layout, by Ward Harrison  
Light as a factor in production, by C. C. Monroe and H. A. Cook  
The Schmidt high-pressure locomotive of the German State Railway Company, by R. P. Wagner  
The balancing and dynamic rail pressure of locomotives, by R. Eksergian  
Annual dinner, Hotel Astor

#### THURSDAY, DECEMBER 6

Design of steam piping to care for expansion, by W. H. Shipman (by title)  
The executive function in industry, by Robert T. Kent  
Cooling and lubrication of cutting tools, (Report of Sub-Committee on Cutting Fluids of the Special Committee on Cutting Metals)  
Zeolite softeners internal treatment, priming and foaming, Sub-Committee No. 3, by C. W. Foulk  
Standard methods of water analysis, Sub-Committee No. 8, by H. Farmer  
Skid handling of interplant shipment:  
New developments in materials handling, by R. L. Lockwood  
Viewpoint of railroads, by J. V. Miller  
The use of skids for water shipments, by H. E. Stocker  
Viewpoint of Great Lakes transportation companies, by G. B. Wright  
Economic aspects of the shipment of material on skid platforms, by C. B. Crockett  
Skid platform shipment of commodities, by F. J. Shepard, Jr.  
Stresses in heavy closely coiled helical springs, by A. M. Wahl  
Fatigue and fatigue-corrosion of spring materials, by D. J. McAdam  
Progress report of the Research Special Committee on Mechanical Springs  
Heavy-duty anti-friction bearings, by S. D. Koon  
Silica Gel, by George E. Hulse

\* \* \* \*



An Express Train in Service on the German State Railways



## Foreign

### First Steel Coaches for Peru

The first all-steel railway coaches for service in Peru arrived there from United States on September 9. The shipment consisted of a train of three coaches designed for service on the standard gage Cerro de Pasco Railway. An increase in the number of trains run by the road made necessary this purchase of additional equipment.

### Western Australian Government Railways

Revenues of £3,858,051 or \$18,788,700, operating expenses of £2,910,811 or \$14,175,600 and net earnings after charges of £26,671 or \$129,800 were reported by the Western Australian Government Railways for the year ending June 30, 1928. These figures compare respectively with the 1926-27 figures of £3,607,989 (\$17,570,900), £2,685,693 (\$13,078,900) and £34,556 (\$168,287) and thus represent increases of £250,000 in gross revenues and £225,118 in expenses but a decrease of £7,885 or \$38,400 in net earnings.

The smaller net earnings are attributable to increased interest charges since the increase of £24,944 in gross profit is more than offset by an increase of £32,829 in interest costs. The total investment as compared with the previous year increased from £21,566,262 to £22,130,077 or £563,815 while average miles operated increased from 3,906 to 3,971. Interest charges per mile increased about \$25 or from £227 in 1926-27 to £232 in 1927-28. A money cost of about 5.8 per cent on the £563,815 of new capital explains the £32,829 increase in total interest outlay. Interest charges averaged approximately 4.15 per cent of capital during the year.

Revenues per mile of road increased £48 over the preceding year while expenses increased £45 leaving a balance equivalent to a \$15 increase in gross earnings per mile to be transformed, however, into a \$10 decrease in net per mile by the \$25 increase in the interest charges. The average capital cost per mile was £5,565 in 1927-1928 as against £5,504 in the previous year.

A total of 5,900,883 train miles were operated during the year or an increase of 419,403 over the previous year. There was also an increase of 256,352 tons in freight carried and of 294,966 in the number of passengers handled. Freight traffic revenues increased £205,964 over the previous year and passenger revenues £47,894. Freight traffic accounted for more than two-thirds of the year's gross revenue. The wheat movement was 23.02 per cent of the total tonnage handled during the year as against 19.3 per cent in the previous year. Miscellaneous traffic, including ores and minerals, accounted for 18.35 per cent and was the second largest movement. This class was third in the previous year when it accounted for 16.88

per cent of the total and local timber accounted for 17.56 per cent. The latter fell to third place in 1927-28 when it amounted to 14.98 per cent of the total.

At the end of the year 1927-28 there were in service 401 locomotives, 478 passenger cars and 23,000 units of freight equipment. The average number of employees during the year was 9,312.

### New Zealand Railways

Gross revenue of £8,524,538 or \$41,514,500 and total expenses of £6,685,123 or \$32,556,500 were reported by the New Zealand Government Railroads for all operations during the year ending March 31, 1928, as compared with gross revenues of £8,434,654 or \$41,076,700 and total expenses of £6,490,880 or \$31,610,500 for the year ending March 31, 1927. Gross earnings fell from £1,943,774 in 1926-27 to £1,839,415 in 1927-28 while the deficit after interest charges was £291,452 or \$1,419,300 in 1927-28 as against a deficit after charges of £99,659 or \$485,300 for the previous year.

From railway operations alone the revenues during the year were £7,343,845 or \$35,764,200 as against a railway revenue figure of £7,423,472 or \$36,152,300 for the previous year. Railway operating expenses were £6,302,119 or \$30,691,300 for 1927-28 and £6,158,283 or \$29,990,800 for 1926-27 while the net from railway operations before charges was respectively £1,041,726 or \$5,073,200 and £1,265,189 or \$6,161,400. The railway operating ratio rose to 85.81 in 1927-28 from 82.96 in the previous year, the gross revenues per mile of road dropped £41, the expenses increased £32 and thus the net per mile fell from £400 in 1926-27 to £327 in 1927-28 or a reduction of £73. Train mile earnings fell seven cents during the year while train mile expenses rose three cents, thus reducing the net per train mile from approximately 56 cents to the equivalent of 46 cents.

There was a reduction from the previous year of 622,500 in the number of passengers handled, but an increase of about 45,000 tons in freight handled. The capital cost per mile of line increased from £15,545 to £16,097 during the year.

At the end of the year there were 678 locomotives in service, or 20 less than at the end of the previous year. Likewise total tractive power of these locomotive units fell from 11,393,226 lbs. to 11,226,374 lbs. during the year. That average tractive power of locomotives in service has greatly increased in late years, however, is indicated by the fact that, during 1925-26, there were in service 704 locomotives with total tractive power of but 10,333,292 lbs. At the end of 1927-28 there were in service 26,736 units of freight equipment and 1,612 passenger cars.

There is considerable discussion in the report on the co-ordination of the various agencies of transport which is held "to be now regarded in most countries as desirable, and, indeed, essential in the public interest." Recent developments and tendencies in legislation concerning highway services in United States, Canada, South Australia and Great Britain are briefly outlined.

## Traffic

Because only four passengers were carried during six weeks, the Pere Marquette has petitioned the Michigan Public Service Commission for authority to discontinue passenger service on its branch line of 37½ miles between La Crosse, Ind., and New Buffalo, Mich. The official Guide shows one train each way daily, except Sunday, classed as "mixed."

The Interstate Commerce Commission has assigned for oral argument on December 7 the proposed report by W. P. Bartel director of the Bureau of Service, and Special Examiner John L. Rogers, recommending reductions in the charges for refrigeration on shipments of fruits, vegetables, berries and melons from the South.

The Public Service Commission of Alabama has authorized the Louisville & Nashville to discontinue passenger train service on its Warrior branch, Monmouth to Warrior, 10 miles. The official Guide shows two trains between these points each way, daily, except Sunday. The order contains a proviso that daily freight service must be maintained.

Arguments will be heard by the Supreme Court of the United States in the lake cargo coal rate case, the United States of America and Interstate Commerce Commission, appellants, v. Anchor Coal Company et al., in which the commission is appealing from the decision of the lower court which declared invalid its order of February, 1928, ordering a cancellation of the reduction proposed by the southern roads of their rates on lake coal. The Supreme court on October 22 announced a finding that "probable jurisdiction" had been shown.

The Pennsylvania, effective December 2, will reroute and reduce the running time of its Southland from Chicago to the west coast of Florida. The new route will utilize the Perry cut-off, just completed by the Atlantic Coast Line in Florida. The new schedule will save five hours, 40 minutes from the previous running time to St. Petersburg, and six hours, 40 minutes between Chicago and Tampa. Under the new schedule the train will leave Chicago at 11:30 p. m. instead of 9:20 p. m. and will arrive at Tampa at 12:15 p. m. the second day. Returning it will leave Tampa at 4:30 p. m. and will arrive at Chicago at 7:30 a. m. the second day. Previously Jacksonville was the terminus of this train but this year, through the use of the Perry cut-off, the train will not enter Jacksonville.

### Freight Damages Reduced

Freight claims paid by the railroads during the first six months in 1928 growing out of loss and damage to freight

were less than those for any corresponding period in recent years. Records of the Freight Claim Division of the American Railway Association show total claims paid of \$18,834,897, as compared with \$19,820,223 for the first six months in 1927 and \$19,084,004 for the same period in 1926. Loss and damage claims growing out of delay show a marked reduction. For the first six months this year the amount of such claims paid was \$1,495,625, a reduction of \$488,141 compared with the corresponding period last year. Reductions were also reported under the head of robbery.

### Rates on Bungs Found Not Unreasonable

Division 5 of the Interstate Commerce Commission has discovered one commodity at least which it finds can stand maximum reasonable rates and therefore may be considered as part of the railway traffic on which rates may be maintained while rates on agricultural products are being reduced under the Hoch-Smith resolution. The commission on October 22 made public a decision by Division 5, consisting of Commissioners Lewis, Woodlock and Taylor, dismissing a complaint filed by the United States Bung Manufacturing Company asking for a reduction of the rates on wooden bungs, in carloads, which are rated as fifth class, from Cincinnati to New York and Brooklyn, Philadelphia, Baltimore and Chicago. After making the usual rate comparisons the report says:

"The Hoch-Smith resolution contemplates readjustments of the rate structure along lines which will permit commodities such as this that can stand maximum reasonable rates to bear them, and which will accord to agricultural products a rate basis which is as low as we may reasonably go under existing law. At the same time it is our duty to maintain carrier revenues reasonably intact in the absence of evidence that these revenues are excessive." The report closed with a finding that the rates assailed were not and are not unreasonable.

### Appreciating Railroad Service in the South

The Atlantic Coast Line, reviewing experiences of recent floods in Georgia and Florida, has issued a circular calling attention to some of the significant results of the means taken by the road to cope with the difficulties incident to interrupted train service. The circular says, in part:

In recent weeks, high water resulting from almost unprecedented rains has caused heavy damage to railroad property and has seriously interfered with train service. In some cases towns of considerable size were all but cut off from the outside world for several days. Inability of the railroads to deliver freight to points affected by the floods was immediately felt. Supplies of fresh meat and vegetables and many kinds of bakery products were soon exhausted. When service was re-established the arrival of local freight trains bringing needed sup-

plies was something of an occasion. Some consignees worked all night to unload cars. \*\*\* "I never realized before how much my business depended on good railroad service," said one man who keeps a neighborhood store.

While the railroads spent thousands of dollars to keep their lines open and to repair breaks, the operators of the bus lines felt under no obligation to do anything to clear or repair the highways they used, and merely suspended service until the county or state put the roads in condition for them.

Business men who understand their dependence upon good railroad service should realize that continued reductions in freight rates will make it impossible for the roads to provide adequate transportation.

### Express Refrigerator Service Opposed

The Louisville & Nashville has filed with the Interstate Commerce Commission a statement of exceptions to the recent proposed report by W. P. Bartel, director of the commission's Bureau of Service, and Special Examiner J. L. Rogers, which recommended that the commission require the railroads to establish express refrigerator service for strawberries from points in the South.

"It would, in our judgment," the L. & N. says, "be economically unsound to establish refrigerator service from the Carolinas to points in the central territory to depress the prices that the Alabama producers now receive, or to force Alabama berries on eastern markets at a time when they are oversupplied with Carolina berries. Express refrigerator service cannot be established by respondent, except at an expense wholly out of keeping with the speculative benefit that might result therefrom to Alabama strawberry producers. If the matter is fully understood, we feel confident that this commission will not require us either to purchase cars, for which we should have no use except during the brief strawberry season, or to operate special express trains, with practically no tonnage, in order to have same available if and when a strawberry shipper elected to ship by express. If the strawberry shippers have a right to demand expedited services that cost the carriers much more than the total charges that they could exact for such service, shippers of other perishable commodities no doubt have similar rights which, if insisted upon, would ultimately place such a burden upon other traffic as to stifle the movement thereof."

### Freight Traffic in August

Freight traffic handled by Class I railroads in August amounted to 42,406,223,000 net ton-miles, an increase of 422,031,000 net ton-miles or 1 per cent, over that of August, 1927, but a decrease of 1,327,788,000 net ton-miles or 3 per cent under that of August, 1926, according to the Bureau of Railway Economics.

In the Eastern district, there was a

decrease of 2.4 per cent, compared with the same month last year, while the Southern district reported a decrease of 6.5 per cent. The Western district reported an increase of 8.4 per cent.

For the first eight months in 1928, the volume of freight handled amounted to 305,381,025,000 net ton-miles. This was a decrease of 8,976,455,000 net ton-miles, or 2.9 per cent, below that of the corresponding period last year and a decrease of 7,202,955,000 net ton-miles, or 2.3 per cent, below that of the same period in 1926.

Railroads in the Eastern district for the eight months reported a decrease of 6.5 per cent, while the Southern district reported a decrease of 8.1 per cent. The Western district reported an increase of 4.8 per cent.

The daily average movement per freight car for the first eight months this year was 30.3 miles per day, the highest average ever attained. This was an increase of four-tenths of one mile above the average for the corresponding period last year and an increase of seven-tenths of one mile above that for the corresponding period in 1926.

The average in August was also the highest for any August on record, amounting to 32.1 miles per day. This was an increase of 1.2 miles above the daily average for August last year and an increase of six-tenths of one mile above that for August, 1926.

The average load per car in August was 27.2 tons, including less than carload freight as well as carload freight. This was a decrease of four-tenths of one ton under the average for August last year. For the first eight months in 1928, the average load per car was 26.5 tons, compared with 27.3 tons for the same period in 1927 or a decrease of eight-tenths of one ton.

### Canadian Coal Rate Subsidies

Test movements of coal from the Maritime Provinces to Quebec and Ontario, as authorized by an order-in-council of the Federal Government, approved while Parliament was in session last spring, have been attended with unexpected success, according to a statement of the Dominion Fuel Board.

Of actual shipments of coal from the Maritime provinces to St. Lawrence river ports, and subject to the subvention to the railways moving that coal from the river ports to inland points in Ontario and Quebec, arrangements have been completed which will cover the movement of about 250,000 tons of water-borne coal, transported to Montreal during the present season of navigation.

So far the benefits of the order-in-council have been applied only to the schedule respecting rail shipments inland from St. Lawrence ports, but when navigation on the river closes the temporary all-rail rates with a maximum of \$3 per ton from Nova Scotia mines, and of \$2.10 per ton from New Brunswick mines, to all points in the province of Quebec will become effective.

The reason for the subvention on the rail shipments of coal ex-St. Lawrence



ports, which amounts to one-fifth of a cent per ton per mile is to determine how far inland markets can be economically established. Of the movement wholly by rail, the government's encouragement of the project is designed to make possible the continued operation of the coal mines during the winter.

As to the test movements of coal from Alberta to Ontario, authorized by an order-in-council passed by the Canadian government on March 16 last, the results so far this year have not been up to expectation. Up to date a total of nearly 40,000 tons has been moved to Ontario. According to the order-in-council, the freight rate on these test movements is \$6.75 per ton from point of origin to point of destination. It is stated that the Alberta coal operators have contracts for 80,000 tons to be moved next year.

The railways have not yet submitted to the Dominion Railway Board their figures as to their out-of-pocket cost for the test movements, so that the Railway Board may determine the extent to which the railways may be granted subventions. At the last session of Parliament \$150,000 was voted to reimburse the railways for the movement of coal from the Maritimes and from Alberta.

The Railway Board has fixed the date of November 6 as the time when the roads should submit their figures, and they were also given until October 20 to show cause why the matter should not be dealt with in public hearing by the board of November 6. So far no move has been made by the railways in this respect.

### Rail-Air Services

The latest step taken in connection with the combined railroad and airplane service known as the Transcontinental Air Transport and involving the Pennsylvania, the Atchison, Topeka & Santa Fe and the National Air Transport, is the placing of an order for ten Ford-Stout all-metal monoplanes to be equipped with Pratt & Whitney "Hornet" motors and designed to carry 12 passengers in addition to a pilot and mechanic. Delivery of these planes is scheduled for about February 1, 1929. Operations of the T.A.T. are expected to begin over the route from New York to Los Angeles some time in the spring of 1929. According to the latest plans developed for this service, passengers will leave New York in the evening over the Pennsylvania, change the next morning to one of the new Ford planes at Columbus, Ohio, and fly to Dodge City, Kansas; there passengers will change back to travel by train, taking the Santa Fe to Las Vegas, N. M., where they will again change to airplane and fly to Los Angeles. The complete trip will be made in approximately 49 hours.

Other rail-air developments are taking place. The Atlantic Coast Line and the Florida East Coast have announced that beginning on January 10, 1929, they will offer a service in conjunction with the Pan-American Airway from New York City to Miami via the railroads and then by plane over the Pan-American Airway System to Cuba and the

West Indies. Daily service will be operated to Havana with a saving of 8½ hours, and a tri-weekly service to Porto Rico, with a saving of 33½ hours to Santiago de Cuba and thence through Santa Domingo and through Haiti to San Juan.

According to the first schedules, passengers will board the Atlantic Coast Line Train No. 83, the Palmetto Limited, at the Pennsylvania Terminal in New York at 7:10 in the evening, arriving in Miami, via the Florida East Coast from Jacksonville, at 7:15 the second morning, 1½ days out from New York. Here they will be met by Pan American Airways cars and transported directly to the company's airdrome, located four miles from the center of the city, where they will have breakfast while uniformed attendants care for the luggage and facilitate compliance with customs regulations.

Within 45 minutes from their arrival in Miami, passengers will board multimotored Pan American airliners, arriving at Camp Columbia Field, in Havana, at 10:15 a.m., having covered the 261 miles between that city and Miami in two hours, 15 minutes—eight hours and 35 minutes faster than any previous travel time by rail and steamer. Through passengers to the West Indies will make the same rail connections from New York, leaving Miami by plane at 9 a.m., arriving at Santiago de Cuba, after stops in Havana, Santa Clara and Camaguey, at 5:10 in the afternoon, 46 hours from New York City, effecting a saving of 33½ hours over previous travel schedules. Remaining in Santiago over night, passengers will arrive in San Juan, Porto Rico, with stop-overs at Port au Prince, Haiti, and Santa Domingo City, Dominican Republic, at 5:15 in the afternoon with a total flying time of six hours from Cuba.

REPRESENTATIVES OF GERMANY'S FOUR LEADING LOCOMOTIVE PLANTS who met recently to discuss the situation of the locomotive industry and to devise ways and means to improve it, have decided to enter into a working agreement for the purpose of promoting the interests of the German locomotive industry as a whole, according to a recent report made public by the Department of Commerce.

The agreement, in its present form, does not contemplate fusion or cartel measures of any kind. It is designed merely as an attempt to place the industry on a firm basis by limiting production to the requirements of the market. It is planned to stop locomotive production in the weaker plants by making it worth their while to turn to the manufacture of other products required by those engaged in the locomotive industry.

At present there are 21 locomotive factories in Germany of which 20 are in operation. Their capacity exceeds the country's requirements by two-thirds and exports do not absorb anything like the surplus.

## Equipment and Supplies

### Locomotives

THE PACIFIC FRUIT EXPRESS is inquiring for one 0-4-0 type locomotive.

THE MANUFACTURERS RAILWAY COMPANY is inquiring for 2 eight wheel switching locomotives.

THE ALASKA RAILROAD has ordered 1 Mikado type locomotive from the Baldwin Locomotive Works.

THE BUFFALO, ROCHESTER & PITTSBURGH contemplates coming in the market in the near future for 25 locomotives, to include switching locomotives and heavy freight type locomotives.

### Freight Cars

GRAND TRUNK WESTERN, see Canadian National.

THE NORFOLK & WESTERN will build 500 all steel automobile box cars at its Roanoke shops.

THE CHIRIQUE LAND COMPANY, Panama, is inquiring through the car builders for 50 freight cars of 15 tons' capacity.

THE BUFFALO, ROCHESTER & PITTSBURGH contemplates coming in the market in the near future for 1000 box cars of 50 tons capacity and may also inquire for 2000 steel hopper coal cars of 70 tons capacity.

THE ROYAL STATE RAILWAYS of Siam will receive bids until January 15, 1929, at Bangkok, Siam, for 300 low side all steel cars, to have four wheels and to be of 12 tons' capacity. Specifications and plans may be obtained from C. P. Sandberg, 100 Broadway, New York.

THE CANADIAN NATIONAL in addition to its recent inquiries for freight cars, is now inquiring for 500 automobile cars for service in the United States on the Grand Trunk Western. This road also contemplates buying from 100 to 200 ballast cars for service in Canada.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 1000 steel underframe single sheathed box cars, of 50 tons' capacity; 500 steel under-frame stock cars of 40 tons' capacity, 1000 drop bottom composite gondola cars of 70 tons' capacity and 250 steel underframe flat cars of 50 tons' capacity. The company will issue inquiries soon for 250 ballast cars.

### Passenger Cars

THE CHESAPEAKE & OHIO has renewed its inquiry for 6 gas-electric rail motor cars.

THE NORFOLK & WESTERN will purchase 10 all steel express cars and 5 all steel mail and baggage cars.

THE CANADIAN NATIONAL, is now inquiring for 10 sleeping cars with twelve sections and one drawing room, 15 sleeping cars with 10 sections and one drawing room and one compartment, 5 combination sleeping cars, 10 buffet parlor sunroom cars, 25 first class coaches and 2 combination baggage and smoking cars, all for service on lines in Canada. Inquiry is also being made for 3 buffet parlor sunroom cars for service in the United States. Inquiry for part of this equipment was reported in the *Railway Age* of October 13.

### Signaling

THE CHESAPEAKE & OHIO has ordered from the Union Switch & Signal Company an electro-pneumatic interlocking for CX cabin, Covington, Ky.; 31 working levers and 20 spare spaces.

THE PACIFIC ELECTRIC has ordered from the Union Switch & Signal Company material for automatic block signals to be installed between Valley Junction, Cal., and Ramona; 17 color-light signals and other materials.

THE CHICAGO & NORTH WESTERN has contracted with the General Railway Signal Company for the installation of car retarders at Proviso, Ill., about 12 miles west of the Chicago terminus. This order includes 27 retarders, type B, each 38 ft. 6 in. long; 51 switch machines and 51 color-light switch signals, type P; hump and repeater signals and three control machines having respectively 7, 15 and 18 panels. A teletype line is to be put in for transmitting switching lists from the yardmaster's office.

### Iron and Steel

THE LOUISVILLE & NASHVILLE is inquiring for 450 tons of structural steel for shops at Mobile, Ala.

THE BUFFALO, ROCHESTER & PITTSBURGH contemplates coming in the market soon for its 1929 rail requirements.

### Machinery & Tools

THE NORFOLK & WESTERN has issued inquiries for about 60 machine tools.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for two 15-ton overhead electric cranes.

THE MISSOURI PACIFIC has ordered one 20-ton gantry crane from the Whiting Corporation.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for one double-wheel heavy duty floor grinder.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA is inquiring for two turret lathes, one 24-in. shaper and one 3,000-lb. hydraulic hammer.

## Supply Trade

The Roller-Smith Company, New York, has appointed Wise & Braisted, General Motors building, Detroit, Mich., its district sales agent in Michigan.

Harold C. Osman, secretary of the Nugent Steel Castings Company, Chicago, and heretofore in charge of sales, has been appointed works manager.

S. W. Perry, Monmouth, Ill., who formerly represented the DeVilbiss Company, Toledo, Ohio, has joined the sales organization of The Alexander Milburn Company, Baltimore, Md., to travel the middle western territory.

R. J. Working, representative of the Central Alloy Steel Corporation, Massillon, Ohio, has been promoted to district sales manager, with headquarters at Cincinnati, to succeed J. D. Dearth, resigned.

John N. Critchlow has been appointed general manager of sales of the Oliver Iron & Steel Corporation, Pittsburgh, Pa. Mr. Critchlow has been located for several years in Detroit as district sales manager for the Pittsburgh-Crucible Steel Company, and later as manufacturer's agent in the Detroit district.

The Potosi Tie & Lumber Company, St. Louis, Mo., has purchased the entire capital stock of the Hobart-Lee Tie Company and will continue the operations of the latter company with no change in name and with the organization intact with the exception that R. E. Lee, president and sales manager; B. S. Lee, vice-president and treasurer; and J. L. Lee, assistant to the president, have retired.

The Association of Manufacturers of Chilled Car Wheels held its annual meeting at the Congress Hotel, Chicago, on October 23. The general opinion of those present, based on the present increase in inquiries and orders, was that business now is more favorable than during the past few months and will show an increase in the immediate future. Officers elected for the ensuing

year were: President and Secretary, G. E. Doke; Vice Presidents, J. A. Kilpatrick, W. C. Bickerman, D. H. Sherwood; Treasurer, E. P. Ward and Consulting Engineer, F. K. Vial.

### Trade Publications

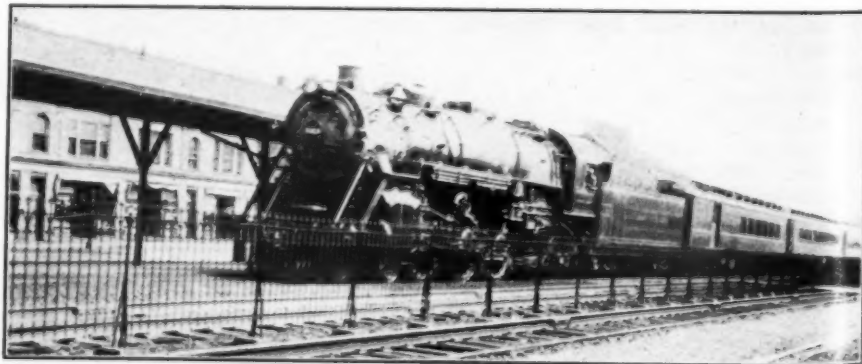
**SPECIAL-PURPOSE STACKERS.**—Numerous types of special-purpose lift trucks and stackers are illustrated and briefly described in the annual edition of the Jack-lift and Stacker Practice folder prepared by the Lewis-Shepard Company, 165 Walnut street, Watertown station, Boston, Mass.

**CLEVELAND TRAMRAIL.**—Circulars illustrating numerous applications of the Cleveland Tramrail system for the storing and distribution of bulk material and the handling of unwieldy loads are being distributed by the Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Company, Wickliffe, Ohio.

**BOWSER EQUIPMENT.**—S. F. Bowser & Co., Inc., Ft. Wayne, Ind., describes and illustrates in a 72-page booklet a complete line of equipment for storing and dispensing gasoline, lubricating oils, paints, paint oils, burning oils, and other liquids (acids excepted). Particular attention is given to the application of this equipment to the railroad industry.

**INDUCED DRAFT.**—The Bayley induced draft and exhaust fan system as applied to the firing of locomotives and the exhausting of gases at the Williamson, W. Va., enginehouse of the Norfolk & Western, and the operating results obtained since its installation over one year ago, are described in Bulletin No. R1 issued by the Bayley Blower Company, Milwaukee, Wis.

**PATENTS.**—Richards & Geier, 274 Madison avenue, New York, is distributing, free of charge, the fourth edition of "Patents—Law and Practice," which has been completely revised by one of the original authors, Oscar A. Geier, in an endeavor to give up-to-the-minute information to lawyers, manufacturers, merchants, and those generally interested in the subject of inventions and trade marks, both in the United States and foreign countries.



Baltimore & Ohio Train at Elizabeth, N. J.



## Construction

**ATCHISON, TOPEKA & SANTA FE.**—A contract for the construction of a two-story reinforced concrete and stone division headquarters building at Wellington, Kans., has been awarded to J. M. Leeper, Topeka, Kans.

**ATCHISON, TOPEKA & SANTA FE.**—Citizens of Emporia, Kan., will vote on November 6 on the issuance of \$55,000 of bonds to pay one-third of the cost of the construction of a subway under the tracks of this company at Mechanic street, Emporia.

**CHESAPEAKE & OHIO.**—This company has filed with the Interstate Commerce Commission a further petition for reconsideration and reargument of the case in which the commission recently authorized the Norfolk & Western and Virginian, through subsidiaries, to build extensions in the Guyandot valley of West Virginia, while denying the application of the C. & O. for a certificate authorizing an extension in the valley. The commission has denied a petition for a reconsideration but the C. & O. now asks a reargument before the entire commission only as to the grant of a certificate to the Guyandot & Tug River, the N. & W. subsidiary and the failure to grant trackage rights to the C. & O. over the Virginian between Gilbert and Stone Coal, W. Va.

The commission, in response to the petition, has further postponed to November 22 the effective date of the certificate and order issued in this case except in so far as they authorized the Virginian & Western to construct its extension.

**CHICAGO & NORTH WESTERN.**—A contract for the diversion of a six-ft. sewer in connection with the construction of the merchandise mart and L.C.L. freight station at Chicago, has been let to W. J. Newman, Chicago, at a cost of about \$50,000.

**CHICAGO, ROCK ISLAND & PACIFIC.**—A contract for the construction of a water treating plant with a capacity of 18,000 gal. per hour at Stewart, Iowa, has been let to the Railroad Water & Coal Handling Company, Chicago.

**CHICAGO, ROCK ISLAND & PACIFIC.**—The Interstate Commerce Commission has extended from December 31, 1928, to December 31, 1929, the time for the completion of the extensions from Liberal, Kan., to the Oklahoma-Texas state line, under the certificate issued by the commission on May 4, 1926.

**CHICAGO, ROCK ISLAND & PACIFIC.**—Authorization has been given for the construction of an extension of the Amarillo-Stinnett branch which will form a connection with the main line of the Rock Island at Liberal, Kan. The new extension will be constructed from Gruver, Tex., to Liberal, about 60 miles. Construction is now in progress from Stinnett, Tex., to Gruver. A contract has

been let to the Bass Construction Company, Chicago, for the construction of a passenger station at Enid, Okla., at a cost of about \$25,000.

**MICHIGAN CENTRAL.**—Work on the coal- ing stations which this company planned to construct at Clarendon, Mich., and West Detroit will not be undertaken until 1929.

**MINNEAPOLIS, ST. PAUL & SAULT STE MARIE.**—This company has let contracts for the construction at Ashland, Wis., of a five-stall brick engine house, the remodeling of four stalls of the present engine house, and the construction of a machine shop, boiler house, storeroom, oil house, a 100-ton automatic coaling station and a single-track automatic cinder conveying plant.

**MISSOURI PACIFIC.**—A contract has been awarded to the Humes Deal Company, St. Louis, Mo., for alterations to a one-story freight station at St. Louis, which will involve an expenditure of about \$20,000.

**NEW YORK CENTRAL.**—A contract has been let to the Roberts & Schaefer Co., Chicago, for the installation of one three-track and one two-track electric cinder pits at Waynesport, N. Y. A contract has been awarded to the Railroad Water & Coal Handling Co., Chicago, for the construction, at Elkhart, Ind., of a water treating plant which will have a treating capacity of 150,000 gal. per hour. Equipment to be installed at the plant will include a tank 62 ft. in diameter and 43 ft. 6 in. in height with four 10-ft. 6-in. downtakes.

**NEW YORK, CHICAGO & ST. LOUIS.**—A contract has been awarded to the Roberts & Schaefer Company, Chicago, for the construction of a cinder handling plant at Charleston, Ill.

**PENNSYLVANIA.**—This road has awarded a contract to Henry Steers, Inc., New York, for work in connection with filling for approaches to its new bridges over the Hackensack River at Marion, N. J. Approximately 1,300,000 cu. yd. of material will be used for the fills.

**PENNSYLVANIA.**—A contract for the construction of a single-track electrically operated cinder handling plant at Norristown, Pa., has been let to the Ogle Construction Company, Chicago.

**PENNSYLVANIA.**—This road has awarded a contract to W. J. Camlin, Newark, Ohio, for the construction of a new freight station at that point. The estimated cost of this structure is approximately \$115,000. A second contract for the construction of a new freight house, to cost about \$70,000, at Norfolk, Va., has been awarded to R. R. Richardson & Co., Inc., Norfolk, while a third for the construction of an industrial branch on Mill street, Morrisville, Pa., at a cost of approximately \$60,000 was given to Ross & Taylor, Trenton, N. J. Work in connection with the relocation of tracks through the plant of the Wheeling Steel Corporation at Steubenville, Ohio, was awarded to the T. J. Foley Company, Pittsburgh, Pa.

**PITTSBURGH & WEST VIRGINIA.**—The Baltimore & Ohio has filed with the Interstate Commerce Commission a second petition asking for a re-opening and reconsideration by the entire commission of the proceeding in which the commission, by a 5 to 4 vote, issued a certificate authorizing the Pittsburgh & West Virginia to build an extension from Cochran's Mill to Connellsville, Pa. The commission had previously declined to grant petitions for a reconsideration filed by the B. & O., the New York, Chicago & St. Louis and the Pennsylvania, but the new petition says that the commission did not deny the petitions but merely ordered that they "be not granted" because one of the commissioners was absent and there was a tie vote of 5 to 5. The petition points out that when the certificate was granted ten of the eleven commissioners were present, although one (Farrell) did not vote, and that the absent commissioner (Meyer) caused to have attached to the report a statement that if present he would have voted against the issuance of the certificate. On the petitions for reconsideration, the petitions says, the minutes of the commission show that a commissioner (Woodlock) who had dissented from the original report was absent because of illness and that the vote on reconsideration was 5 to 5. A motion to reconsider the vote also resulted in a tie. The petition also points out that the assistant director of finance who heard the testimony, recommended denial of the application of the P. & W. V. and that the determination of the case in accordance with the usual practice of the commission, by Division 4, would have resulted in the affirmance of the proposed report. Five members of the commission, the petition says, have indicated that the application should be denied and six have indicated that the petitions for re-opening, reargument and reconsideration should be granted. In reply to a statement filed by the P. & W. V. that it had started work on the extension under the certificate, the B. & O. says it has caused an investigation to be made and that "such work as has been done by the applicant is colorable merely, and that there has been no real commencement of construction and none is intended."

**SOUTHERN PACIFIC.**—A contract for the grading for a line from Merrill, Ore., to Alturas, Calif., 83 miles, has been let to the Utah Construction Company, San Francisco, Calif. This is the second unit of the 97-mile extension from Klamath Falls, Ore., to Alturas.

**SOUTHERN PACIFIC (Pacific lines).**—Plans have been prepared for the construction of a brick and stucco passenger station at Delano, Cal., at a cost of about \$30,000.

**THE BOSTON & MAINE'S "DOLLAR DAY"** excursion tickets sold in connection with Columbus day celebrations, were bought at practically every station on the road. These tickets, giving a round trip for a price of only one dollar above the one-way fare, were offered throughout the company's lines and were bought by 4,800 persons.

## Financial

**CHICAGO, ROCK ISLAND & GULF.—Stock.**—The Interstate Commerce Commission has authorized this company to issue \$108,000 of stock to be delivered to the parent company, the Chicago, Rock Island & Pacific, in payment for advances used in construction work.

**CINCINNATI UNION TERMINAL.—Stock and Control.**—The Interstate Commerce Commission has authorized this company to issue \$3,500,000 of common capital stock to be sold at par in equal amounts to the Baltimore & Ohio, the Chesapeake & Ohio, the Cincinnati, New Orleans & Texas Pacific, the Cleveland, Cincinnati, Chicago & St. Louis, the Louisville & Nashville, the Norfolk & Western and the Pennsylvania—the funds thus raised to be used for construction purposes.

**GREAT NORTHERN.—New Director Elected.**—Stephen Baker, president of the Bank of the Manhattan Company, New York, has been elected a director to succeed Albert L. Ordean of Duluth, Minn., deceased.

**GULF & SABINE RIVER.—Abandonment.**—The Interstate Commerce Commission and the Louisiana Public Service Commission have authorized this company to abandon a 6-mile line between Nitram and Fullerton in Vernon Parish, La.

**HOOSAC TUNNEL & WILMINGTON.—Bonds.**—The Interstate Commerce Commission has authorized this company to issue and sell \$75,000 of first-mortgage 5 per cent bonds.

**LUDINGTON & NORTHERN.—Extension.**—The Interstate Commerce Commission has authorized this company to construct 3,136 ft. of line in Mason County, Mich.

**MISSOURI-KANSAS-TEXAS.—Dismissal of Anti-Trust Complaint Asked.**—This company has filed with the Interstate Commerce Commission a formal petition for dismissal of the proceedings on the commission's complaint against it for violation of the Clayton law in the purchase of stock of the St. Louis Southwestern. The petition states that the M-K-T no longer holds any stock of the Cotton Belt. L. F. Loree conferred with members of the commission on October 17 and informed them that the M-K-T had been released from its contract to buy 155,000 shares of Cotton Belt stock, that the \$7,000,000 it had paid on account had been returned and that the Kansas City Southern had sold 20,000 shares of the Common stock. This left the K. C. S. with 135,000 shares of preferred stock of the Cotton Belt.

**MISSOURI PACIFIC.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority for the authentication and delivery of \$35,750,000 of first and refunding mortgage 5 per cent bonds and for the sale of \$25,000,-

000 of the bonds to Kuhn, Loeb & Co., at 96½ and interest. Authority is also asked to pledge and repledge from time to time \$10,750,000 of the bonds. In a separate application authority is asked for the authentication and delivery and pledge of \$10,000,000 of similar bonds.

**PAJARO VALLEY CONSOLIDATED.—Abandonment of Operation.**—The Interstate Commerce Commission has authorized this company to abandon operation as to interstate and foreign commerce its line from Spreckels to Watsonville, Calif., 27.3 miles of main line and 12.8 miles of branches.

**SEABOARD AIR LINE.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority to guarantee \$1,063,000 of Seaboard All-Florida first mortgage 6 per cent bonds and to pledge them as collateral for short term notes. Separate applications for authority to issue the bonds and deliver them to the Seaboard were filed by the Seaboard All-Florida, the Florida Western & Northern and the East & West Coast.

**SOUTHERN PACIFIC.—Construction and Abandonment.**—The Interstate Commerce Commission has authorized this company to construct a line from San Jose, Calif., to Lick Station, 5.6 miles, and to abandon a 1-mile line in San Jose. The new line will be double-tracked and is estimated to cost \$3,246,393.

**ST. LOUIS-SAN FRANCISCO.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority to issue and pledge \$8,000,000 of consolidated mortgage bonds, stating that it deems it essential that it should have available to meet future capital requirements a larger supply of bonds available for pledge as security for short-term notes.

**WACO, BEAUMONT, TRINITY & SABINE.—Securities.**—The Interstate Commerce Commission has authorized this company to issue \$901,500 of capital stock and \$3,000,000 of first mortgage, 20-year, 6 per cent bonds, series A, the stock to be issued in exchange for first mortgage bonds now outstanding and the new bonds to be sold at not less than 89 and proceeds used to retire outstanding bonds and other indebtedness, and provide funds for capital expenditures already made or in prospect.

### Dividends Declared

International Railways of Central America.—Preferred, 1¼ per cent, quarterly, payable November 15 to holders of record October 31.  
Norfolk & Western.—Extra, \$2; Common, \$2, quarterly, both payable December 19 to holders of record November 30.  
Wheeling & Lake Erie.—Prior lien, \$7, for period November 1, 1916, to October 31, 1917, payable November 1 to holders of record October 25.

### Average Price of Stocks and of Bonds

	Oct. 23	Last week	Last year
Average price of 20 representative railway stocks	121.80	122.01	118.70
Average price of 20 representative railway bonds	93.73	93.58	96.22

## Officers

### Executive

**Wade H. Askew**, assistant freight traffic manager of the Gulf, Mobile & Northern, has been promoted to assistant to the vice-president, with headquarters as before at Mobile, Ala.

**John D. Caldwell**, secretary and assistant treasurer of the Chicago & North Western, with headquarters at Chicago, who has in addition been elected vice-president, has been in the service of that railway for more than 43 years. He was born at Lynn, Mass., on July 4, 1863, and entered railway service in 1880 as a telegraph operator on the Delaware & Chesapeake (now part of the Pennsylvania) at Easton, Md. Later he was a telegraph operator and clerk in the motive power department of the Northern Central and the Baltimore & Potomac (both now parts of the Pennsyl-



John D. Caldwell

vania) and a telegraph operator and secretary to the superintendent of motive power of the Denver & Rio Grande. In July, 1885, Mr. Caldwell entered North Western service as secretary to the president where he remained until January, 1909, when he was promoted to secretary, with headquarters as before at Chicago. He was also appointed assistant treasurer in 1919. Since December, 1915, he has also been secretary of the Chicago, St. Paul, Minneapolis & Omaha. Mr. Caldwell served as a director of the North Western from April, 1926, to April, 1927, and in April, 1928, he was re-elected as a director.

### Operating

**A. A. Lowe**, trainmaster on the Coast division of the Southern Pacific at San Francisco, Cal., has been promoted to the newly created position of general transportation inspector, with headquarters at the same point.



**H. M. Diver**, assistant superintendent and engineer on the Canton Railroad, with headquarters at Baltimore, Md., has been appointed superintendent, with headquarters at Pier 4, Canton, Baltimore. The position of assistant superintendent has been abolished.

**Elmer L. Bennett** who has been promoted to superintendent of passenger transportation of the New York Central lines west of Buffalo, N. Y., with headquarters at Cleveland, Ohio, has been in railway service for more than 35 years. He was born on August 10, 1875, at Girard, Pa., and, after attending Girard Academy, he entered the service of the Lake Shore & Michigan Southern (now part of the New York Central) as a telegraph operator on the Erie division on August 10, 1893. For the following seven years he performed the duties of telegraph operator at a number of points



Elmer L. Bennett

on the Erie division and on May 5, 1900, he was transferred to the train dispatcher's office at Cleveland. On November 1, 1907, Mr. Bennett was advanced to chief dispatcher's clerk on the Toledo division, where he remained until May, 1913, when he was appointed special passenger clerk. From July 1, 1917, to January 1, 1925, he was successively clerk in the office of the superintendent of passenger transportation and chief clerk, then being promoted to chief clerk and inspector on the line west of Buffalo. Mr. Bennett's promotion to superintendent of passenger transportation became effective on October 1.

**Harry J. Plumhof**, general superintendent of the Southern district of the Union Pacific, with headquarters at Kansas City, Mo., has been promoted to general manager of the Oregon Short Line, with headquarters at Salt Lake City, Utah. Mr. Plumhof succeeds **Howard V. Platt**, who at his own request, on account of ill health, retired from active railway service on October 25. **W. H. Guild**, assistant to the vice-president in charge of operation of the Union Pacific System, with headquarters at Omaha, Neb., has been promoted to general superintendent of the

Southern district, succeeding Mr. Plumhof. Mr. Plumhof was born on July 21, 1881, at Eureka, Nev., and entered railway service as a blue print boy in the office of the chief engineer of the Oregon Short Line at Salt Lake City in



Henry J. Plumhof

May, 1899. He learned stenography in his spare time and in 1902 he became secretary to the superintendent of the Idaho division at Pocatello, Idaho. From 1904 to 1910 he served successively as chief clerk to the division engineer at Salt Lake City, chief clerk in the car service department at that point and chief clerk to the general superintendent, also at Salt Lake City. Mr. Plumhof was then advanced to trainmaster at Pocatello and two years later he was further advanced to assistant superintendent at that place. During 1914 he was safety agent, with headquarters at Salt Lake City, and in the following year he was appointed secretary to the vice-president and general manager of the Short Line, where he remained until 1916 when he became contract agent at Omaha and, under federal control of the railroads, assistant to the federal manager of the system. At



W. H. Guild

the end of federal control in 1920, Mr. Plumhof was promoted to general superintendent of the Southern district of the Union Pacific. Mr. Guild was born at Omaha on October 25, 1883, and after serving from 1903 to 1912 as a

clerk and stenographer on the Union Pacific at that point he became chief clerk in the office of the general superintendent. Two years later he was appointed chief clerk to the general manager and in 1916 he was advanced to assistant to the general manager. Mr. Guild was promoted to assistant to the vice-president in charge of operation in 1920.

## Traffic

**Joseph E. Griffin**, division freight agent on the Pennsylvania at Terre Haute, Ind., has been promoted to coal freight agent, with headquarters at Chicago.

**Earle C. Wight** has been appointed assistant general freight agent on the Baltimore & Ohio, with headquarters at Baltimore, Md. In addition to his new duties, he will retain supervision of intercoastal traffic under the jurisdiction of the foreign freight traffic manager.

**Everett D. Davis**, general freight agent of the Buffalo, Rochester & Pittsburgh with headquarters at Rochester has been promoted to assistant freight traffic manager with the same headquarters. He will be succeeded by **Webster H. Francis**, assistant general freight agent at Rochester.

**T. L. Darneal**, district freight and passenger agent for the Missouri-Kansas-Texas Lines at Denver, Colo., has been promoted to assistant general freight agent of the Missouri-Kansas-Texas of Texas, with headquarters at Dallas, Tex.

**E. L. Mountfort**, assistant freight traffic manager of the Gulf, Mobile & Northern, with headquarters at Chicago, has been promoted to freight traffic manager, with headquarters at Mobile, Ala., succeeding **J. A. Jackson**, deceased. The position of assistant freight traffic manager at Chicago has been abolished.

## Mechanical

**Thomas J. Stocks**, machine shop foreman on the Green Bay & Western at Green Bay, Wis., has been promoted to superintendent of shops, with jurisdiction over both locomotive and car shops at the same point.

## Purchases and Stores

**T. M. McKeown**, purchasing agent on the Canadian Pacific at Vancouver, B. C., has been appointed assistant general purchasing agent, with headquarters at Montreal. **E. C. P. Cushing**, purchasing agent at Calgary, has been transferred in the same capacity to Vancouver, and **Frank Cooper** has been appointed assistant purchasing agent, with headquarters at Vancouver. **R. J. White** has been appointed purchasing agent at Calgary and **J. Arnott** has been appointed assistant purchasing agent at that point. **W. T. Plumb** has been appointed assistant purchasing agent, with headquar-

ters at Winnipeg. All the above appointments are effective November 1.

## Obituary

**Byron J. Torbron**, general coal and ore agent of the New York Central, with headquarters at Cleveland, Ohio, died in that city on October 19.

**Le Roy H. Mathis**, assistant general freight agent of the Louisiana Railway & Navigation Company, with headquarters at Shreveport, La., dropped dead on the street from a heart attack in that city on October 14.

**William Bollons**, who retired as superintendent of the second division of the Oregon-Washington Railroad & Navigation Company in March, 1926, died at St. Vincents Hospital, Portland, Ore., on October 20 at the age of 70 years. At the time of his retirement Mr. Bollons had been in the service of the Union Pacific System for 36 years.

**R. I. Cheatham**, assistant to the freight traffic manager of the Seaboard Air Line at Norfolk, Va., died on October 18, at New York. Mr. Cheatham had been in the service of the Seaboard Air Line almost continuously for 55 years, having entered its service as a messenger. At one time Mr. Cheatham was freight traffic manager of this road but was forced to give up that work on account of ill health.

**Charles H. McConnell**, mechanical engineer on the Pittsburgh & Lake Erie, died suddenly on October 20. Mr. McConnell was 49 years of age and had been in the employ of the Pittsburgh & Lake Erie for 27 years, having first entered its service in October, 1902, as electrician and subsequently serving as

assistant electrical engineer, and electrical engineer. He was appointed mechanical engineer in September, 1927.

**William C. Esgar**, superintendent of passenger transportation of the New York Central lines west of Buffalo, N. Y., died of pneumonia on September 23 at a hospital at Cleveland, Ohio, following an operation. Mr. Esgar had been in the service of the New York Central and its subsidiary companies for nearly 42 years. He was born at Hubbard, Ohio, on November 5, 1865 and entered railway service on the Lake Shore & Michigan Southern, (now part of the New York Central), as a yard clerk at Stoneboro, Pa., in December, 1886, being advanced to clerk in the office of the superintendent at Youngstown, Ohio, in March of the following year. From July, 1891, to October, 1913, Mr. Esgar served successively in the yard office, as yard master and as car distributor at Youngstown, as special clerk at Cleveland, and as assistant chief clerk to the general superintendent. He was then advanced to statistician in the office of the general manager and in April, 1915, he became assistant chief clerk to the general manager. On May 1, 1920, Mr. Esgar was promoted to superintendent of passenger transportation of the line of the New York Central lines, west of Buffalo, with headquarters at Cleveland.

**John Adrian Jackson**, freight traffic manager of the Gulf, Mobile & Northern, who died at his home in Mobile, Ala., on October 7, was born on May 24, 1863, in Wilkes County, Ga. He entered railway service in May, 1876, as messenger boy on the Louisiana & Nashville at Nashville and a few years later he went with the Atlanta & West

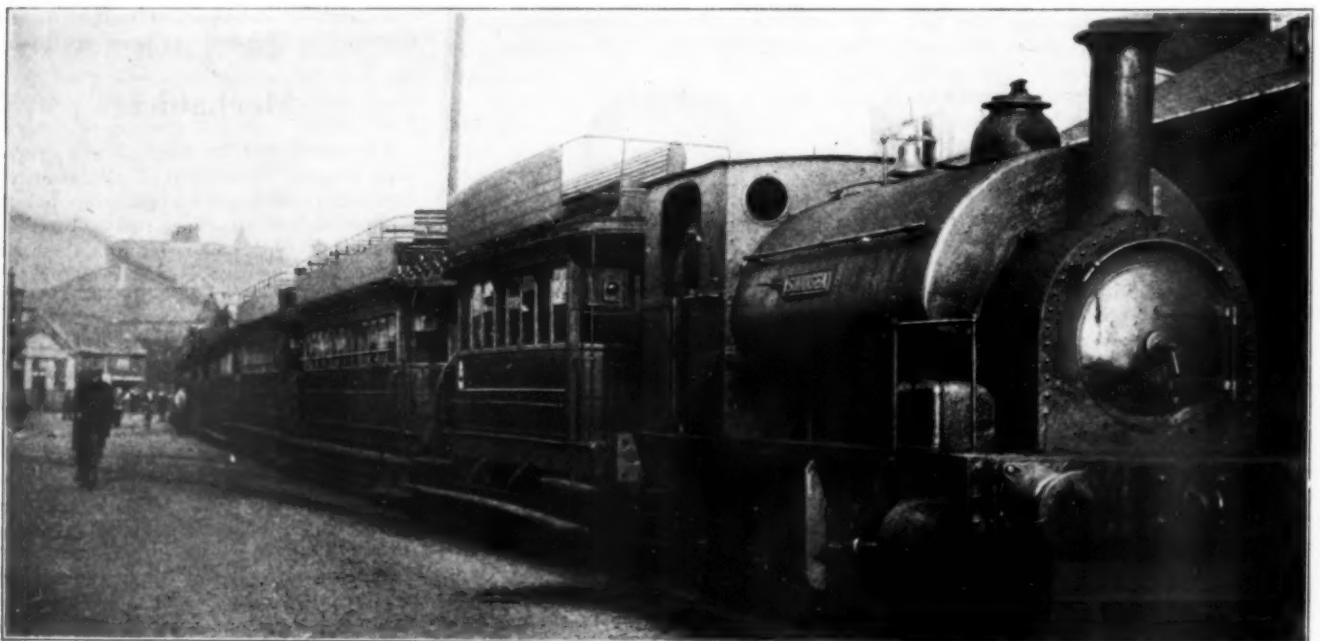
Point as rate clerk at Montgomery, Ala. From October, 1889, to 1891, he was chief clerk of traffic on the Atlanta & Florida. He then served as traveling freight and passenger agent for the Atlanta & West Point, later becoming chief clerk to the traffic manager on the same road. In 1893 he served as chief



John Adrian Jackson

clerk to the general freight agent of the Central of Georgia and from 1894 to 1905 he was commercial agent for the same road. He entered the service of the Mobile, Jackson & Kansas City (now the Gulf, Mobile & Northern) in 1905 as chief clerk, freight department, subsequently serving as commercial agent at Memphis, Tenn., and assistant general freight and passenger agent. In 1919 he was appointed general freight agent and two years later he was promoted to assistant traffic manager. He was promoted to freight traffic manager in May, 1926, in which capacity he served up until the time of his death.

\* \* \* \*



Wide World

A Passenger Train with Tram-like Coaches on Old Welsh Railway between Swansea and Mumbles Pier, Built in 1807 and now to Be Electrified



# Railway Age

Motor Transport Section  
Devoted to the  
Coordination of Railway and Highway Service

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ELECTRIC DRIVE  
*for*  
GAS-ELECTRIC BUSES  
AND TRUCKS

**GENERAL**

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.



# Railway Age



## Motor Transport Section

*Devoted to the  
Co-ordination of Railway and Highway Service*

Vol. 85, No. 17

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### *Railway Motor Coach Fleets Grow*

**T**HREE years ago, when comparatively few railways were operating motor coaches, it was predicted that, when the railways once actually undertook such operations and proved to their own satisfaction that motor coach operation by a railway is beneficial, they would lose no time in developing fully the motor transport possibilities of the territories served by their lines. This prediction has proved correct, and the most widespread progress to date has been made this year. Take, for example, the New England Transportation Company, which operates more motor coaches than any other steam railway subsidiary. Only a few months ago this company had 240 coaches in its fleet. At the present time it has 270 and is operating 25,000 coach miles per day. At the other end of the country is the Southern Pacific Motor Transport Company. Now operating 90 motor coaches, it has more than doubled the size of its highway fleet during the past six months. These examples are typical of the railways which are operating motor coaches. Furthermore, this rapid progress in railway motor coach operation is being made in what is, practically speaking, only the beginning of the development. If the present rate of growth is maintained, and it appears now that it will be speeded up even more, the steam railways will soon exceed the electric railways in the number of motor coaches operated.

### *"Mechanical Prophylaxis"*

**R. W. MEADE**, president of the Peoples Motorbus Company, St. Louis, Mo., borrowed a good word from the medical profession when he used the term "mechanical prophylaxis" in describing the system of mechanical inspection and repair used by his company, in the paper which he presented at the recent annual safety congress in New York. Prophylaxis, as defined in medicine, is the art of guarding against, preserving from, or preventing disease; observance of the rules necessary to preserve health; protective, preservative, or preventative treatment. Mr. Meade's definition of prophylaxis, as applied to the mechanical condition of a motor coach, is anticipation and prevention of trouble instead of waiting for it to occur. "Mechanical prophylaxis" treatment applied to the work of keeping locomotives and cars in a safe and suitable condition for service is an old story to the railroad mechanical department officer. Consistent application of this treatment, however, has been an important factor in bringing about the present high operating efficiency of the railroads. One has only to view a line-up of motor coaches operated by several companies, including one or more railways, to be convinced that the railroads are extending the mechanical prophylaxis

treatment to their highway equipment. Clean, attractive motor coaches in safe mechanical condition are a traffic-building asset. The well-kept, attractive motor coach is the sign of an efficient, dependable operating company and differentiates it from those of "fly-by-night" operators.

### *Should Trucks Be Operated by Subsidiaries or Contractors?*

**M**ANY railways are operating motor trucks or tractors and trailers to transport freight in replacement of trains or trap car service over their lines or in their terminals. In most cases railways engaging in such operations have not operated the trucks either directly or through subsidiaries, but have entered into contracts with truckmen or trucking organizations in the territories affected to provide for the operation of the vehicles. In other cases, the railways are themselves operating the equipment or are carrying on such operations through subsidiary companies. One of these methods must be more desirable, generally speaking, than the other; but which is it? Proponents of motor truck operation through contracts argue that this method results in a favorable public sentiment, since the railway is not competing with individual truckmen; that the railways know nothing about the operation of motor trucks, while they can obtain the services of experts in motor trucking through contracts; that difficulties encountered in the purchase of equipment, from manufacturers who are also large shippers, are done away with; and even that through competition among truckmen for railway contracts, the cost of trucking service is kept lower than it would be if the railway were operating trucks itself. These are strong arguments which several of the railways have demonstrated to their own satisfaction to outweigh considerations in favor of direct or subsidiary operation. On the other hand, practically all railways are operating motor coaches through subsidiaries and consider this the only proper means of engaging in such business. While there are certain dissimilarities between motor truck and motor coach operation, which affect such a comparison, it seems reasonable to contend that if the railways should operate motor coaches through subsidiaries, they should also operate motor trucks in this fashion. As a matter of fact, the same arguments which are used in favor of the contract operation of motor trucks might just as well be advanced in favor of the contract operation of motor coaches; yet in spite of these arguments, practically every railroad operating motor coaches is doing so through a subsidiary. This would appear to indicate that much is to be said upon both sides of this question. That it is an important one goes without saying. The Motor Transport Division might well make it a subject for study, report and discussion at its next meeting.

### *Passenger Officers' Association Studies Highway Competition*

**T**HE Motor Transport Division has secured a valuable ally in the American Association of Passenger Traffic Officers. This association at its recent meeting in Colorado Springs probably heard the most vigorous discussion on record of the problem of highway competition for passenger business. This problem, from a railroad standpoint, is two-fold. The competition of independent highway operators must be met, and the railways must reduce the costs of providing lightly-patronized passenger service. Opinion at the convention pointed strongly to the advisability of the railways themselves establishing motor coach lines, as a defensive measure against independent competitors, and as a means of providing service at lower cost. The association did not commit itself to a definite policy, however, but appointed a committee to make a thorough investigation into the subject and report to the membership its findings as soon as possible. Members of this committee attended the meeting of the Motor Transport Division in Detroit this week, establishing contact between the passenger officers' association and the division. With two such organizations hard at work on this important problem, the diffusion of accurate and complete information on its various aspects ought soon to become widespread in railroad circles and its final solution advanced. The problem is troublesome, but it can be solved. Several railroads already have largely solved it.

### **Frisco Employees Petition for Interstate Regulation**

**T**HIRTY thousand employees of the St. Louis-San Francisco are signing a petition to be addressed to the senators and representatives in Congress from the nine states in which the Frisco operates, asking them to give their support to the enactment of federal legislation providing for "just and fair" regulation of common carrier motor coaches and motor trucks operating in interstate service. The nature of this petition, which is being circulated among the employees of the railway by 65 Frisco employees' clubs, is described in the news pages of this issue of the *Motor Transport Section*.

This petition should have a salutary effect. It would doubtless exert an even more powerful influence upon Congress if it were signed also by persons who are not employees of the railroad. The paramount reason for the failure of Congress to pass one of the numerous bills providing for federal regulation of motor vehicles operating across state lines, which have been presented at each session of Congress for several years, has been, according to observers, the lack of an appreciable amount of public sentiment in favor of the passage of the bills. Representatives of the steam and electric railways, motor vehicle operating organizations and motor vehicle manufacturers have presented a united front in their testimony at congressional hearings on the various motor transport regulation bills in favor of the principle of regulation. The public, however, according to those who have watched the progress of the campaign, have displayed little interest in the proceedings, and it is a fact that Congress is never in a hurry to act upon legislation which is favored by those

affected by it, but has not the backing also of the general public.

What is needed most at this time to bring about the early passage of a motor vehicle regulatory bill by Congress is an aroused public sentiment in favor of such action. Perhaps the petition which the employees of the Frisco are sending to their representatives in Congress will be construed as evidence of this sentiment. Would not it be advisable, however, if the railways, both steam and electric, and the motor vehicle operators who have declared themselves in favor of federal regulation, would take it upon themselves to see that public sentiment in their support is aroused?

### **Will L. C. L. Freight Traffic Be Lost Too?**

**E**VERYONE is familiar with the great extent of the losses in passenger traffic which the railways have suffered during recent years. Due to the advent and common usage of motor coaches and private automobiles, the railways have seen their passenger traffic dwindle steadily, until this year they will carry fewer passengers than since 1909. Less attention has been attracted by the decline in the tonnage of l.c.l. freight traffic on the steam railways; yet this form of traffic, too, has decreased substantially. Is it not time, therefore, to take stock of the situation and to try to anticipate the future trend of l.c.l. freight traffic?

The trend in the amount of l.c.l. freight handled by the railroads has been downward for some years. In 1917, the number of tons of this freight originating on the railways was 53,768,625. It remained very close to that level until 1921, when there was a drop to 41,992,011 tons. During 1922 and 1923, the tonnage showed a tendency to recover somewhat from the extreme depression of 1921, but in the latter year the peak of the recovery was reached when 44,338,556 tons were originated; the steady decline then began once more. In 1924, there was a total of 40,549,023 tons of l.c.l. freight. The volume was practically the same in 1925, but in 1926 it had dropped to 39,490,989 tons, and in 1927 to 38,425,225 tons. These decreases, furthermore, developed in years when railroad freight tonnage, while not showing a tendency to increase much, nevertheless showed just as little tendency to decline. This year the decline in l.c.l. freight tonnage seems to be continuing for in the first quarter of this year, 8,825,807 tons were handled, 2.68 per cent less than a year ago.

The l.c.l. freight handled in 1927 represents a decrease of about fourteen per cent from that in 1923. This decline, while less striking than that in passenger traffic, is nevertheless quite as good cause for uneasiness. It is impossible to say with any degree of exactness what part of this decrease has been caused by competition from common carrier, contract carrier and privately-operated motor trucks, tractors and trailers, but it seems reasonable to assume that diminishing l.c.l. freight tonnage in the face of the aggregate freight tonnage which is, at least, holding its own, is due to factors in the situation which affect l.c.l. freight traffic only, and that probably the motor vehicle is an important one of these factors.

The answer may lie in the operation of trucks, tractors and trailers by the railways themselves or through the provision of container or some similar services. Diminishing traffic, whatever the causes, cannot be looked upon complacently.





A Santa Fe Coach at an Indian Village

## Operating the Santa Fe's Motor Coaches

*Dispatching system permits flexibility required by nature of service—Rules governing drivers*

THE operating problem presented by the varied services rendered by the Santa Fe Transportation Company are in many respects unique. With its fleet of more than 40 motor coaches, automobiles, trucks, tractors and trailers, the company operates three ordinary motor coach routes, two fixed route tour services, a large number of special tours, a tractor and trailer service for the handling of mail, baggage and express between Lamy, N. M. and Santa Fe, and a city transfer service for passengers and baggage within the city of Santa Fe. Naturally, with so large a part of its operations consisting of special runs, the problem of providing equipment on short notice for each day's requirements, whatever they may be, is a difficult one. The solution of this problem is embodied in the dispatching system which governs all of the operations of the company.

The key man in direct control of the operating situation is the dispatcher, whose headquarters are in the Santa Fe Transportation Company garage at Santa Fe. All drivers report to him for instructions and in his office are located the operating control board and the driver's call board. Instructions to the dispatcher as to the equipment required on any day are issued from the offices of the superintendent and of the Courier Service in the form of operating orders. These apply only to the regular "Indian Detour" trips and to the so-called "land cruises" for special parties. Advance notice as to the number of passengers to be handled on the Indian Detour trips and on the special cruises is furnished by the Atchison, Topeka & Santa Fe. The conductors on Santa Fe trains, both eastbound and westbound, telegraph the number of passengers on their trains for the Detour 12 hours in advance of the

arrival time at Albuquerque or Lamy, the starting points of the Detours. Reservations for cars to handle special parties are ordinarily made well in advance by the traffic agencies of the Santa Fe. Cars for such purposes are ordered from the superintendent's office through the office of the Courier Service, the car order stating the number of people to be handled, the date of their arrival, and the class of car to be used.

### Operating Control Board

The dispatcher is materially assisted in visualizing each day's operating situation by the operating control board which hangs on a wall of his office. This is a wooden board measuring some four feet by three feet, ruled into columns and bearing at the top painted headings which indicate the location of the company's equipment for the current day. The headings are: Santa Fe Garage, Albuquerque Garage, Indian Detour—subdivided to show the first day, second day, third day and whether eastbound or westbound, Albuquerque stage, Lamy stage, Las Vegas stage, Pecos drive, Taos drive, Cochiti drive, Land Cruise, Special, and Out of Service. Each unit of equipment is numbered and represented by a metal tag bearing its number. The tags are hung on hooks on the control board by the dispatcher under the heading which indicates the location of that unit for the day.

To supplement the operating control board, the dispatcher keeps a line-up of cars, coaches and drivers. This line-up, which is reproduced herewith, shows the date, the numbers of the coaches or cars, and the names of their drivers operating on the ordinary motor coach run, and in the case of land cruises and Indian Detours, the duration and destination of the trips being made by each coach and the number of the day of the trip. The

line-up also has spaces to show the numbers of the coaches in the garage at Santa Fe, and the names of the drivers assigned to them. By means of the operating control board and the dispatcher's line-up, the dispatcher has a clear picture at all times of the number of coaches in service or available for service, their location and, in the case of cars and coaches used in the tours, how soon they will be released for other service.

DISPATCHER'S CAR, COACH AND DRIVER LINE-UP			
Date _____			
To Albuquerque		From Albuquerque	
Unit No. _____	Driver _____	Unit No. _____	Driver _____
Unit No. _____	Driver _____	Unit No. _____	Driver _____
Unit No. _____	Driver _____	Unit No. _____	Driver _____
Unit No. _____	Driver _____	Unit No. _____	Driver _____
To Las Vegas		From Las Vegas	
Unit No. _____	Driver _____	Unit No. _____	Driver _____
Unit No. _____	Driver _____	Unit No. _____	Driver _____
Land Cruise	Unit No. _____	Driver _____	Day _____
Land Cruise	Unit No. _____	Driver _____	Day _____
Land Cruise	Unit No. _____	Driver _____	Day _____
Land Cruise	Unit No. _____	Driver _____	Day _____
Land Cruise	Unit No. _____	Driver _____	Day _____
Land Cruise	Unit No. _____	Driver _____	Day _____
O. S. T.	Unit No. _____	Driver _____	Day _____
O. S. T.	Unit No. _____	Driver _____	Day _____
O. S. T.	Unit No. _____	Driver _____	Day _____
O. S. T.	Unit No. _____	Driver _____	Day _____
O. S. T.	Unit No. _____	Driver _____	Day _____
O. S. T.	Unit No. _____	Driver _____	Day _____
Headquarters - Garage	Unit No. _____	Driver _____	Day _____

The Line-Up Furnishes a Complete Picture of Each Day's Operation Situation

Such a detailed picture of the operating situation is essential to the company, owing to the variance from day to day of so large a part of its operations. The dispatching of stages on the regular motor coach

THE SANTA FE TRANSPORTATION COMPANY			
DATE _____			
DISPATCHER'S WEEKLY MILEAGE REPORT			
To be completed and handed in to Assistant's Office, made up to 6:00 P. M. on 14th, 16th, 18th and last day of month. Mileages must be as accurate as possible and taken from Dispatcher's Report. Cars out at 6:00 P. M. on dates mentioned should be recorded as in known mileage. Send copies on this report to Mr. Clark.			
CAR PLATE NO.	MILEAGE LAST WEEK	MILEAGE THIS WEEK	TOTAL TO
100			
101			
102			
103			
104			
TOTALS			
105			
106			
107			
TOTALS			
108			
109			
110			
TOTALS			

CONFIRMED THAT THE ABOVE FIGURES ARE CORRECT

The Dispatcher Reports Weekly Mileage Figures

runs is naturally less difficult. One motor coach and one driver are regularly assigned to the daily round trip operated between Santa Fe and Las Vegas. Two motor coaches and three men are assigned regularly to make the three daily round trips between Santa Fe and Albuquerque, the drivers alternating in spending a night at Albuquerque. Three motor coaches and three drivers are regularly assigned to the eight daily round trips

operated between Santa Fe and Lamy, these trips being made exclusively for passenger service. To handle mail, baggage and express between Santa Fe and Lamy, all train service having been replaced by highway service, two men, a driver and a helper, are assigned regularly to make four round trips daily between Santa Fe and Lamy, operating a truck and a tractor.

### Dispatcher's Order

Instructions from the dispatcher to the drivers as to their duties are conveyed in the form of a dispatcher's order. This shows the date, the number of the motor coach or car covered in the order, and the name of the driver. The dispatcher fills in this information, including also the line or service on which the coach is to be used, the run number and special orders. The driver completes the information as to the time of departure and arrival, the number of minutes late, if any, and the reasons for delay. He also shows the speedometer reading at the beginning and at the end of the trip and the mileage covered.

On the reverse side of the dispatcher's order, various information is required as a trip report. This is filled in by the driver, and the form is delivered to the dispatcher immediately upon the driver's return from his trip. The trip report bears the car number, the number of passengers, and the name of the courier accompanying the car. Immediately below is a space in which

DISPATCHER'S DAILY CAR REPORT				
Date _____				
CAR NO.	DRIVER OR OPERATOR	DESTINATION	MILEAGE	LINE OR SERVICE CHARGE
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
TOTAL MILEAGE FOR DAY				

Daily Report of All Operation Made on This Form

the driver renders a report on purchases made, the number of gallons of gasoline and quarts of oil secured at Santa Fe, tire pressures on all tires, information as to tire changes on the road, including the tire number, the speedometer readings, and the wheel from which the tire was taken and to which it was transferred. The rest of the trip report concerns the car condition. The principal parts of the coach are listed, and the driver is required to mark "O. K." or "defective" against each, giving the nature of the defects in spaces provided for this information.

The dispatcher's order is supplemented by the driver's callboard which hangs outside the office of the dispatcher. This callboard shows the names of the drivers called, the date and time when they are to report for duty and their destinations. Daily weather reports are also posted on an announcement board outside the dispatcher's office.

At the end of each day the dispatcher fills in a daily car report. Every car or truck leaving the garage during the day or night is represented on this sheet and the form is sent to the accounting office from the garage on the following morning. The daily car reports include information as to the destination and mileage of each car and driver, and the line or service charge, i. e., whether against the Indian Detour, the land cruises by Packard cars, special coach, Lamy-passenger, Lamy-



truck, Albuquerque, Las Vegas line, and Service runs. The transportation order number is noted in the case of Packard cars on cruises, and the notation is made, in the case of service equipment, as to whether it is chargeable to the Santa Fe Transportation Company, to non-revenue, to the Harvey Company, or others. Charge tickets for service equipment charges accompany this report, these tickets showing the person or firm to be charged, the service rendered and the amount of the charge. Transportation orders covering the movement of the Packard cars are submitted with the report also. At the bottom of the report, the dispatcher shows the total mileage covered by the entire fleet of equipment for the day.

Another report rendered by the dispatcher is the weekly mileage report which is made up to 6 p. m. on the seventh, fourteenth, twenty-first and last days of each month. This report is submitted to the accounting office. Mileages are taken from the dispatcher's order reports, and cars out of the garage at 6 p. m. on the dates mentioned are recorded at the last known mileage. A carbon copy of this report is sent to R. H. Clarkson, who has charge of the Santa Fe Transportation Company. This mileage report bears the number of each unit in the company's fleet of equipment, its mileage during the preceding week, its mileage during the current week and its aggregate mileage. This report is signed by the dispatcher who certifies that the entries are correct.

Operating Control Signals

Anyone riding over the route covered by the equipment of the Santa Fe Transportation Company is im-

THE SANTA FE TRANSPORTATION CO.					
Dispatchers Order					
Car No.:		Date:			
Driver or Operator:					
LINE OR SERVICE:		STOP			
		START			
		MILEAGE			
Run No.	Leave	Arrive	Mins. Late	REMARKS	
SPECIAL ORDERS					
<small>Dispatcher will insert car No., date, driver or operator, line or service, run No. and special orders. Operator will complete information as to time of departure and arrival, minutes late and reasons for delay. Reverse side will be completed and signed by driver or operator and form delivered to Dispatcher promptly upon return from trip.</small>					

Dispatcher's Order to Drivers

mediately struck by the colored signs which are located at various points along the road. These are operating control signals placed by the company, and the observance of the instruction that they convey is rigidly required of drivers. When the drivers come upon a yellow spot signal at the top of a hill, they are required to come to a full stop, to test the brakes and to descend the hill in the gear directed by the operating or-

der. A square signal painted with two yellow bands divided horizontally by a green band requires operation at not more than ten miles per hour until a similar sign on the left side of the road is passed. During this time the drivers are required to sound a half siren frequently. A green signal in the shape of a pyramid indicates a blind curve. Drivers are required to restrict their speed to 20 miles per hour until the road is clear

TRIP REPORT			
CAR NO.	NO. PASSENGERS	COURTESY NAME:	
DRIVER'S REPORT OF PURCHASES:			
GALS. GASOLINE—SANTA FE		QTS. OIL—SANTA FE	
TIRE PRESSURE			
R. F.	R. S.	R. R. O.	L. R. O.
L. F.	L. S.	R. R. I.	L. R. I.
TIRE CHANGES ON ROAD			
TIRE NO.	Speedometer Reading	FROM	TO
CAR CONDITION			
Mark OK or defective against each. State nature of defects below.			
Motor	Speedometer		
Clutch	Horn		
Transmission	Oiling System		
Differential	Steering Gear		
Brakes	Dash Instruments		
Elect. Equip.	Wheels		
Lights	Body		
Chains	Tools	Road Equip.	
Unusual noises not located.....			
Date of Return		Signed	
Driver or Operator			

Driver's Trip Report

ahead, sounding a full siren and keeping close to the right of the road. A blue signal in a diamond shape indicates a narrow road. Drivers are required to come to a full stop on such roads when an approaching car is passing. The control release is a similar sign on the left side of the road.

Government of Drivers

The Santa Fe Transportation Company does not employ men as drivers who have previously been engaged as professional operators of motor coaches or trucks. Instead, it prefers young men who wish to grow with the business. Its motor coach operators making regular trips, are paid \$140 per month, and the drivers of motor coaches on the Indian Detour or land cruises by Packard automobiles are paid \$90 per month. Drivers of all kinds are paid a bonus of \$20 per month, provided they have not been involved in any accidents where a claim of any nature must be made on the insurance company and their cars have not been damaged in any way, and also provided that no complaints have been made against them for speeding or careless driving, lack of attention to guests or untidiness. Consequently it is in the drivers' interests to insure that their cars are fully inspected and passed on every day on their return to the garage. If this is not done, damage may be lo-

Two days off each month are allowed to operators who have completed full working time during the pre-

## Reimbursement from Expenses on Duty Is Claimed by Drivers on This Form

Free rooms are provided in Albuquerque for drivers operating over the Indian Detour schedule. No allowance is granted for meals and no reduced rates are allowed at Harvey hotels or restaurants. A reduced rate of 75 cents for lunch for drivers is allowed at the Apache Inn at Valley Ranch. Drivers on the Indian Detour are permitted to make their own arrangements to carry lunch with them. Drivers when detailed for work over routes other than the regular Indian Detour schedules, which will necessitate their being away from home, are granted allowances toward expenses in the following amounts: Breakfast, 25 cents; dinner, 50 cents; supper, 75 cents, lodging, \$1.50. These allowances are paid at the company's offices in Santa Fe immediately on the completion of the trip, on presentation of the employees' expense form certified by the dispatcher.

The cost of the uniform is deducted from the wages semi-monthly up to a maximum of eight dollars per month, until the uniform is paid for in full. A slip is issued with the pay check showing the amount deducted and the balance due the company. If any driver leaves the company before the cost of his uniform is paid in full, the unpaid balance remaining is deducted from the wages due. The uniform, except for badges, becomes the property of the employee when it is fully paid for. When necessary, the company furnishes drivers with the official sheepskin-lined coat on payment of a deposit of \$8.50 per coat, returnable if the coat is turned in in serviceable condition if the driver should leave the company's service. As an alternative, drivers may purchase these coats from the stockroom at the stated price. All employees coming into contact with the public must wear the company's official badge. A worsted hat or cap badge and a metal breast badge are issued to each employee, against deposits of 75 cents and \$1.50 respectively. These badges are the property of

**SAFETY FIRST UNDER ALL CIRCUMSTANCES**

All drivers are required to take extreme care of the company's property in their charge. Servicing of equipment is carried out under the supervision of the mechanical superintendent, and all drivers may be called upon to assist in this work if necessary. All washing and cleaning of equipment is done by the drivers. All are required to pass the company's medical examination as to physical fitness before employment and at such times as may be required thereafter. Neglect to abide by the instructions given them is sufficient cause for immediate discharge.



All these conditions of employment are agreed to by applicants for positions as drivers. In applying for employment, prospective drivers must sign the following agreement:

"I hereby agree to the conditions of employment of the Santa Fe Transportation Company and to abide by all rules and regulations of the company as may now or hereafter be published. I also agree to furnish such bond as the company may require against negligence resulting in damage or loss to the company's equipment, and properly confided to its care.

"I hereby further agree to the following conditions which shall be binding on me if I receive employment from the Santa Fe Transportation Company.

"(1) That said company may dispense with my services at any time, my wages to cease at the time of such discharge.

"(2) In the event that I shall at any time have the custody of money or other property of the said company and shall fail to account for same to full satisfaction of the said company, or in the event of any damage to the said company by reason of failure on my part to properly perform my duties, I agree to make good on demand all such loss or damage, and I hereby authorize the said company to retain my wages or compensation unpaid or owing to me to an amount sufficient to compensate the said company in full for said loss or damage.

"(3) That my retention in the service of the said company after violation of any of the agreements herein contained shall in no case be construed as a waiver by the said company of its rights under the agreement, and the said company may discharge me at any time because of such non-compliance or violation with the same force and effect as though such discharge had been made at the time when the said non-compliance or violation occurred.

"(4) That I will upon demand, upon the termination of my employment, return each and every article, tool, implement or appliance loaned or entrusted to me by said company for the purpose of my employment, and in the event of my failure so to return upon such demand or upon the termination of my employment any such article, tool, implement or appliance, I hereby consent and agree that the company may deduct from any monies or salary then due me an amount equal to the purchase price thereof.

"I hereby certify that I fully understand the responsibility relative to obtaining employment under false pretenses."

#### Demerit System

The Santa Fe has a demerit system in effect which governs the amount of the bonus paid the drivers. Demerits are given as follows:

Failure to stop at crossing.....	100 demerits
Disregard of operating order.....	50 "
Disregard of operating control signal.....	50 "
Running out of gasoline.....	50 "
Speeding or reckless driving.....	50 "
Failure to punch tickets when money collected.....	50 "
Proven complaints of discourtesy or lack of service.....	100 "
Smoking in motor coach.....	25 "
Failure to fill out accident report forms.....	25 "
Failure to keep disc wheel or rim nuts tight.....	25 "
Failure to turn in tire change report.....	25 "
Failure to wear any part of uniform on duty.....	25 "
Failure to report broken seals on tool boxes.....	25 "
Smoking on unloading platforms.....	15 "
Failure to keep inside of car clean.....	15 "
Entering dispatcher's office without permission.....	15 "

\* \* \*

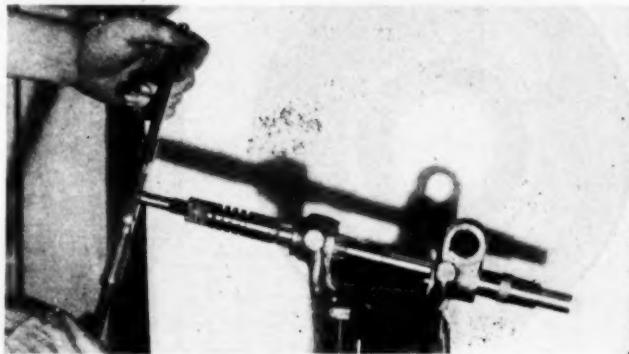
Arguing with other employees in public.....	10 "
Profane language on duty.....	10 "
Untidy personal appearance.....	10 "
Failure to report for work on time.....	10 "
Failure to balance receipts properly.....	10 "
Failure to fill out trip reports properly.....	10 "

If a driver has no demerits during the month, he receives the full bonus. If he has 10 demerits, he receives 90 per cent of the bonus; if 15 demerits, 85 per cent; if 25 to 50 demerits, 50 per cent; if 55 to 75 demerits, 25 per cent; if 80 to 90 demerits, 10 per cent of the bonus. If a driver has 100 demerits during a month, he receives no bonus and is liable to discharge.

[This is the third of a series of articles on the operations of the Santa Fe Transportation Company. The fourth will appear in a later issue.—THE EDITOR.]

## Extension for Use With Scully Expansion Reamers

THE Scully Steel & Iron Company, Chicago, is offering for use with the Scully JMC expansion reamer an extension designated as the JMC king-bolt pilot. It converts the piston-pin type JMC reamer into a steering-knuckle type. In many cases the JMC reamer can be used for reaming the bushings in water pumps, transmission gears and other places where the distance between the two bushings is considerable.



The Scully JMC King-bolt Pilot or Extension

One size king-bolt pilot will fit several sizes of JMC reamers, in fact, only four sizes are required to fit all sizes from .605 in. to .999 in., having a total range of from .595 in. to 1.031 in.

The regular taper pilot bushings or guides, as used with the piston pin type, are used with the king bolt pilot to center the reamer and to insure reaming holes in line. Because of the large range of expansion, only a few sizes of JMC reamers are needed for practically all reaming jobs.



A Fleet of Five International Harvester Model 63 Three-ton Motor Trucks Equipped with Steel Dump Bodies Used by a Railroad Contractor

# Electric Control Unit for Motor Coaches

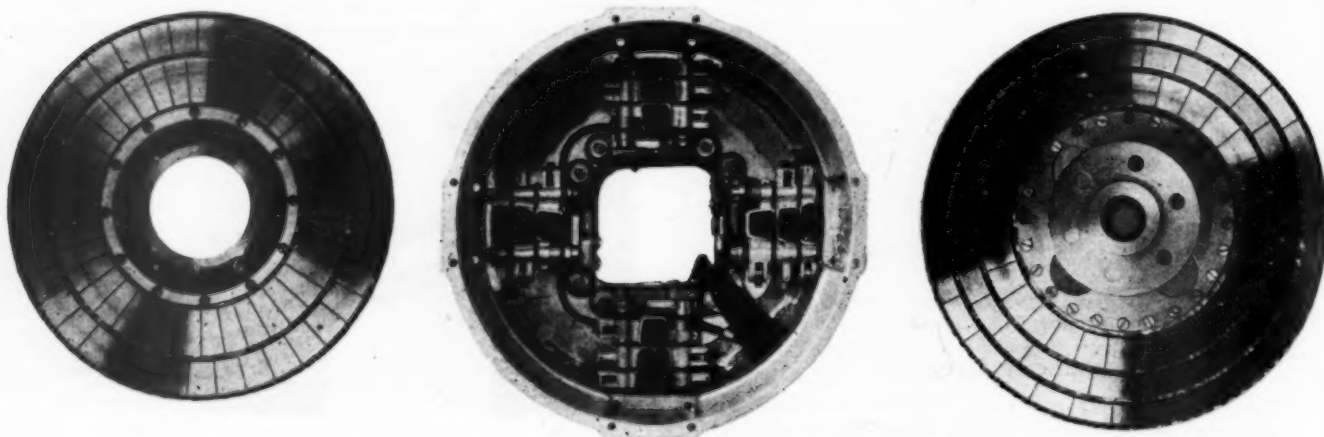
*Makes possible high speed operation with no material increase in weight over the mechanical drive*

**T**HE use of motor coaches equipped with gas-electric drive is almost entirely confined to city operation for the reason that this type of drive is not considered practical for long distance high-speed operation. The present type of gas-electric drive is practical for city operation because of the need of quick acceleration which is imperative when many stops are made.

After many years of development and road testing, the Fraser Electric Transmission Corporation, Cleveland, Ohio, has put in operation an electro-control unit, road tests of which have shown that it can be operated at high speed for prolonged periods of time. The National Railway Appliance Company, 420 Lexington ave-

The unit consists of a direct-current generator, which is direct-connected to and driven by the coach engine, and an electric motor which takes current from the generator and drives the propeller shaft of the vehicle, both contained in a single housing. This construction saves space and weight. The unit drives the vehicle without the use of transmission gears and delivers power to the rear axle through a wider range of speed and turning effort than can be accomplished economically with gearing. There is no mechanical connection between the engine and the driving axle.

A coach driven by this unit has an unusually wide speed range because there is available to the driver not only all of the initial speed range of the engine, but in



The Multi-Cylinder Motor Commutator; The Generator Brushes, and The Multi-Cylinder Generator Commutator and Generator Driving Sleeve

nue, New York, has been made the sales representative for the Fraser unit in the United States.

## A General Description

The Fraser unit is an electrical machine which transmits and controls the power from an engine to the rear axle in a gas-electric coach. In a normal installation, the unit takes the place of the engine fly wheel, the clutch, the gear transmission and, in many instances, of the service brakes as well. In all cases, electric braking is available whether mechanical service brakes are used or not. In addition to this, it is practical to use the unit as an engine starting motor, drawing current from a standard 12-volt lighting battery and, when desired, it may be made to function as a battery charging generator.

The weight of the unit, together with the necessary auxiliaries, is such that when installed so as to take full advantage of all the functions of the unit, the total weight of the coach is heavier than a similar mechanically driven vehicle by less than 300 lb.

addition, the speed range obtained through the possible changes with the electrical transmission.

## Only One Field for Two Armatures

The conventional electric machine consists of one armature winding located in its field. The conventional gas-electric coach includes in its equipment at least two electrical machines, a generator and a motor, each with its single armature winding and its field.

The Fraser unit consists of multiple windings on the armatures of both the generator and motor and has only one field for both armatures with their multiple windings. This feature has made possible a considerable saving in weight.

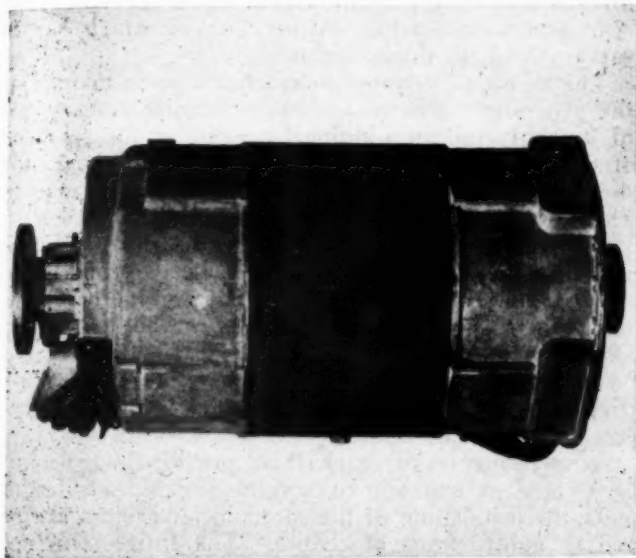
The unit has been designed so that it may be mounted as a unit with the engine or as a separate unit mounted in the most suitable place in the coach chassis. In either case, the generator is direct-connected to the engine, and the motor is direct-connected to the propeller shaft of the conventional type of driving axle with its differential.

While the unit includes a direct-current generator



and a direct-current motor and while each of them function independently, they are both housed in a single unit and only one magnetic field is used for both the generator and motor. The unit is of such a design and construction that it permits the perfect and independent functioning of each element.

An extreme range of speed as well as unusual torque capabilities has been provided as shown in the speed-torque and overall efficiency curves illustrated. This speed range has been provided for the purpose of maintaining fast running schedules and the heavy torque is provided for starting and accelerating the vehicle quickly and to permit reasonable vehicle speeds in



The Fraser Motor Coach Unit Complete Ready for Attachment

heavy pulling. While these characteristics have been developed to an unusual degree and while the weight of the apparatus has been reduced, it has all been accomplished without loss of efficiency.

#### New Type of Commutator Used

Owing to the peculiar design and arrangement of the parts, with the resulting electrical characteristics, it is possible to depart from conventional practice in the matter of commutators for both the generator and the motor. Long experience during the development of Fraser units has demonstrated that a disc type commutator for this particular machine is greatly to be preferred to the more conventional cylindrical type. It has been found after long observations that the wear and, therefore, the maintenance of both the brushes and commutators is much less with this type of commutator on this particular machine than is the case with conventional designs.

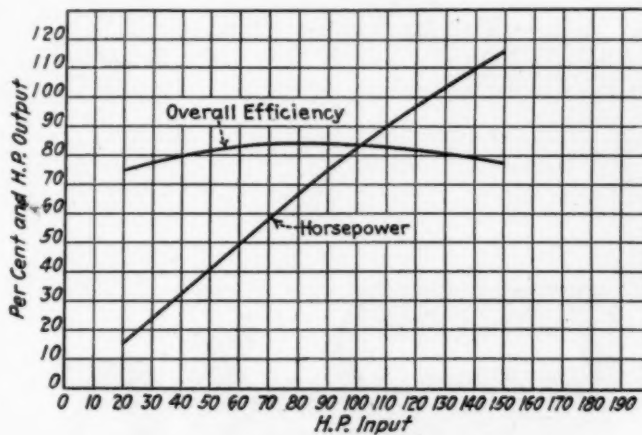
#### Insulation of Segments

The segments in the commutator are insulated from each other by air instead of mica. This method of insulation prevents the brushes from jumping and sparking which often occurs when the segments are mica insulated. As no mica is used, there is no possibility for the segments to wear away, leaving high spots of mica between them.

No commutating poles are required since there is practically no field distortion and very little field leakage. These results are obtained from the fact that two inductors, one a generator and the other a motor, cut

the same lines of force and the field distortion of one is counteracted by the other. So the practical effect of this feature is that both the generator and the motor function sparklessly under all conditions of operation, including the reversal of the motor.

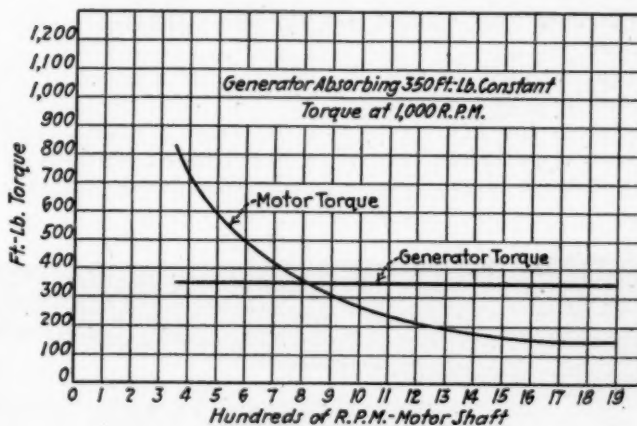
The rotating members of the unit are referred to as



Overall efficiency curve

inductors instead of armatures because neither one of them carries any magnetic iron. The only iron contained in their construction is the steel banding wire which is used to retain the structure in position. This banding wire has no measurable effect on the functioning of the inductors. Elimination of the iron core from the inductors effects a material saving in weight and there are no electrical losses.

The actual output of the unit is under the control



Speed Torque Curve

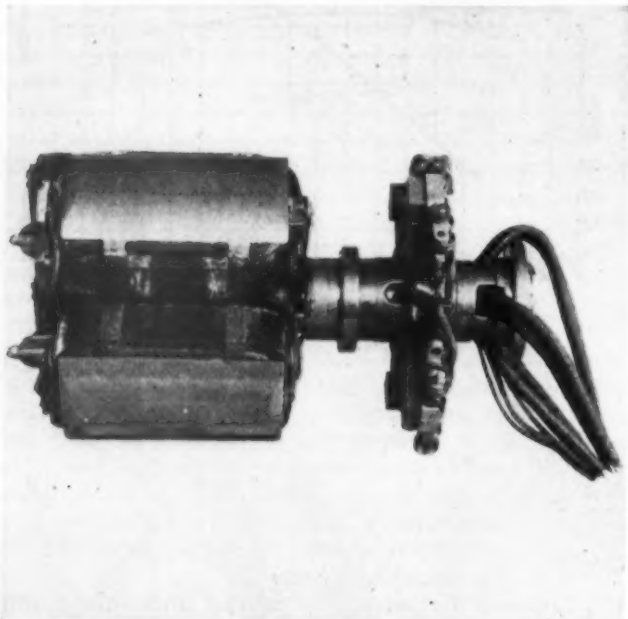
of the operator by throttle control and electric controller manipulation. The normal speed range obtained by electric controller manipulation varies from a motor speed of approximately  $1/3$  that of the engine to something like  $2\frac{1}{2}$  times the engine speed. This extremely wide speed range permits the operation of the engine during a very large portion of its running time under conditions of maximum engine economy.

It is said that it is entirely possible and practical to operate a vehicle driven by a Fraser unit so that the increased efficiency of the engine more than offsets the normal losses due to the conversion of energy through an electrical device, so that over the average road it is possible to haul a ton a mile with less gasoline than would be required even with the conventional geared transmission.

In the Fraser unit the field coils and poles are mounted in the center of the structure. This results in large inductor diameters, permitting greatly increased copper space, high peripheral speed with low rotative speed and a mechanical torque radius approximately doubled. The outer case of the machine becomes the return path for the magnetic flux.

#### The Mechanical Features

The two inductors are so built that the motor inductor telescopes into the generator. They are both



Assembled Field Element with the Motor Brushes in Place

then mounted so that the longitudinal conductors of both inductors cut through the lines of force passing between the field poles and the outside casing. All rotating parts are carried on anti-friction bearings of sizes much larger than is usually considered necessary

for carrying the loads imposed. Each of these bearings is lubricated by an individual grease passage.

In the case of a unit power plant installation, the generator driving sleeve is bolted rigidly to the crank shaft of the engine, the generator thus becoming the engine flywheel. The forward housing of the unit is bolted rigidly to an adapter member, which in turn is bolted to the engine crankcase. The generator driving flange also carries the cooling fan.

The generator brush holders may be removed quickly through hand holes provided in the forward housing. The rear end of the generator is supported on a bearing of its own so that the weight of the generator is divided between the engine crank shaft bearing and the rear generator bearing, neither one of which has to carry a load of any magnitude.

The motor is mounted in much the same manner as the generator. The motor has a bearing at each end of its shaft and an additional bearing at the rear end of the motor inductor. On the rear end of the motor shaft is attached the propeller shaft driving flange to which is rigidly attached the propeller shaft itself.

All of the cables and wires are brought out of the unit in accessible positions and each is properly insulated and protected both electrically and mechanically. From their point of exit the cables may be carried to any point in the chassis which the particular installation requires. The motor brushes may be removed for purposes of inspection or replacement, through the rear end of the machine.

A speedometer drive shaft is provided which can be located in any one of several angles in order to make the installation of the speedometer cable a simple and straightforward procedure. The entire structure becomes a sturdy self-contained unit.

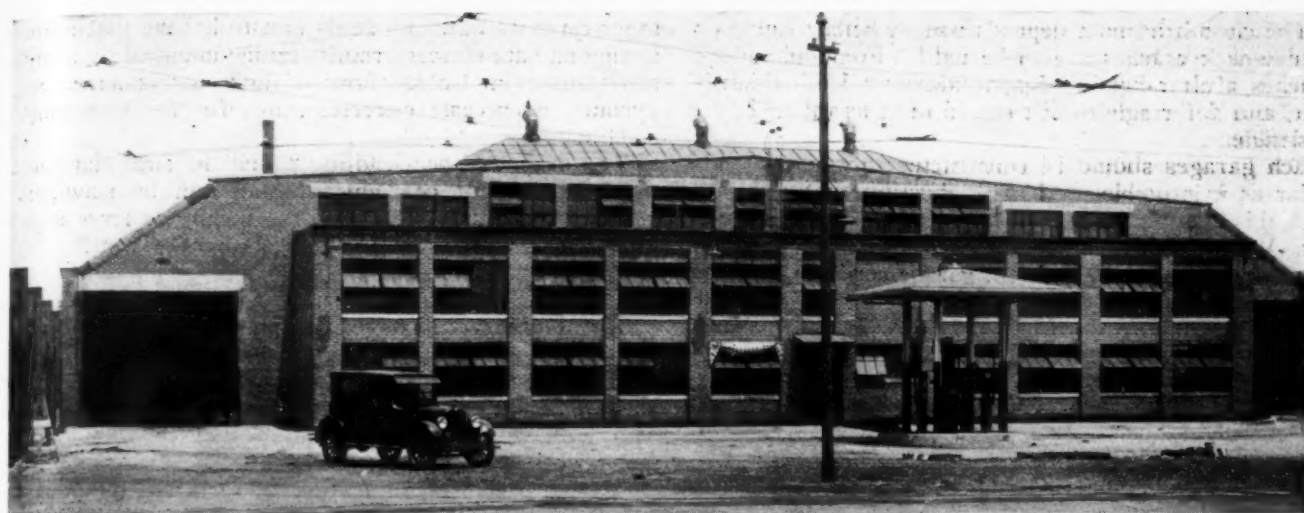
Alloy steels are used where the members are to be highly stressed in service. Aluminum alloy is used where the stresses are not too great and where weight can be saved by its use. Copper is used wherever it will improve the electrical performance. The material used for the magnetic members is carefully selected for its magnetic properties.

\* \* \* \*



A Gas-electric Twin Coach in Service of United Electric Railways, Providence, R. I.





Exterior of the Arborway Garage, Showing Island Arrangement of Fuel Pumps

# Points in Motor Coach Garage Design\*

*General factors which should be considered in providing proper storage and maintenance facilities*

By H. M. Steward

Superintendent of Maintenance, Boston Elevated Railway, Boston, Mass.

**D**URING the last five years, there has been a rapid development with respect to the proper design of motor coach garages, and a great deal of interest has been shown in this branch of the railway industry. It was realized that the problem with respect to housing coaches differs from that with respect to housing trolley cars. A trolley car must necessarily operate along fixed lines on tracks, whereas coach operation is free and flexible. It is desirable, therefore, to design buildings to house coaches which will allow for the freest movement of the vehicles. Experience has shown that modern garage design should provide for a building as nearly as possible in the shape of a square, with long spanned trussed roofs and with as few columns in the floor space as are necessary. The elimination of columns is of great importance, as the length of coaches, particularly those used in interurban business, is constantly being increased.

In determining the number of motor coaches to be stored in any one garage, consideration must be given to the number to be kept within any section enclosed by fire walls. This matter has always been considered in connection with car house design in order that the loss in equipment in the event of fire may not be too serious. At the present time, many of the state and city regulations limit the area of a garage section, if sprinklered, to 20,000 sq. ft. This area will permit the storage of about 57 coaches, which, at \$10,000 per coach, represents an investment of \$570,000 in coaches alone. It is a question whether larger spaces, even if

local regulations permit, ought to be provided, thereby running the risk of destroying a larger number of coaches in the event of fire. It must be borne in mind that a fire in a garage will spread quickly, and it is not likely, in the event of fire, that many coaches can be removed from the building, even if the garage is located with exits on one or more adjacent streets, and while the loss might be covered by insurance, the loss of the coaches would be a serious handicap to operation. A garage section of 20,000 sq. ft. permits an economical design.

A careful study of the probable requirements for coach operation should be made to determine whether a building of this size should be erected, even if the immediate requirements do not demand it. If a larger number of coaches than can be readily housed in a section 20,000 sq. ft. in area, is required, additional sections can be provided.

## The Building Itself

Where possible it is preferable to construct a building of one story only in order to provide natural light and to obtain suitable ventilation. Some of the earlier garage designs provided for buildings two and sometimes three stories in height and often with a basement. With such design, considerable difficulty was experienced in providing natural light and proper ventilation. Buildings of more than one story also require columns, preventing the clear span which is particularly desirable. This is an important factor with respect to choosing the site. It is therefore advisable to select land outside of congested areas in order to have ample room for a one story building and an adjacent yard, which is desirable for proper operation.

\*From a paper read before the American Electric Railway Engineering Association at the convention held in Cleveland, Ohio, September 22-28.

The clear headroom depends upon whether single or double-deck coaches are to be used. For double-deck coaches a clear height of approximately 15 ft. is sufficient, and for single-deck coaches not less than 12 ft. is desirable.

Coach garages should be constructed throughout, insofar as it is possible, of non-combustible material. In fact, this is a requirement in many sections of the country. When built within the fire limits of cities, the law, in many cases, requires that a garage conform to first-



Interior of Somerville Garage, Lower Level

class building construction, and in such cases the roof trusses, columns, etc., must be suitably fire-proofed. When fire-proofing is necessary on the roof steel, the length of the clear span may have to be reduced or plate girders used instead of trusses on account of the extra weight of the fire-proofing material. The writer has found that if fire-proofing is actually required, roof construction with a clear span of over 80 ft. is not practicable. If longer spans are actually required, then it will be necessary to construct the garage with some columns or to locate it in that part of the city where first-class construction is not required.

In certain sections of the country the local regulations allow the use of wooden trusses and plank roof, and the insurance rates for such construction are satisfactory. While it is possible to construct wooden trusses made up of members having heavy fire-resisting cross sections, with tension members of wood instead of wrought iron or steel rods, and also with a reasonably high roof with sprinklers, it is possible to use a plank roof without serious results from fire. It is doubtful, however, whether such construction results in a material saving over the use of steel. The writer's experience with the use of wooden trusses and planked roof on

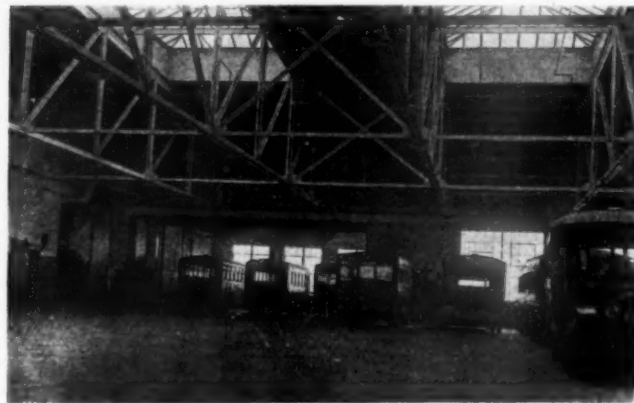
other types of buildings leads him to believe that more lasting and satisfactory results can be obtained by using steel trusses and some form of light cast concrete or gypsum, or precast concrete slabs, for the roof construction.

The design of the building should be such that the maximum amount of light and air can be provided through the outside walls and by means of large skylight areas with proper ventilators in the roof.

#### Floors, Drainage and Doors

The floors should be of concrete, finished with a hard wearing surface, in order to resist wear when chains are used during the winter months and also to prevent dust. Garage floors present a serious problem with respect to providing a surface which will not absorb oil. Experiments should be made and information sought with respect to securing a material which will not only provide a hard wearing surface but will repel oil and grease.

Unless a very large number of coaches are used in any one locality, sufficient to warrant special machines or apparatus for washing purposes, the coaches are usually washed on the garage floor; in



Upper Level of Somerville Garage

this case the floor should be laid out in blocks from 30 ft. to 40 ft. square, or similar dimensions, suitably sloped so that the water will be taken care of by means of standard floor drains having four-inch outlets and provided with large sand containers. The covers or gratings on these drains and the top castings holding the gratings should be of heavy construction. The floor drainage system should be connected with some form of gasoline trap, which is required in most cities to prevent the gas from entering the sewage system.



Exterior of Boston Elevated Railway Somerville Garage—Upper Level



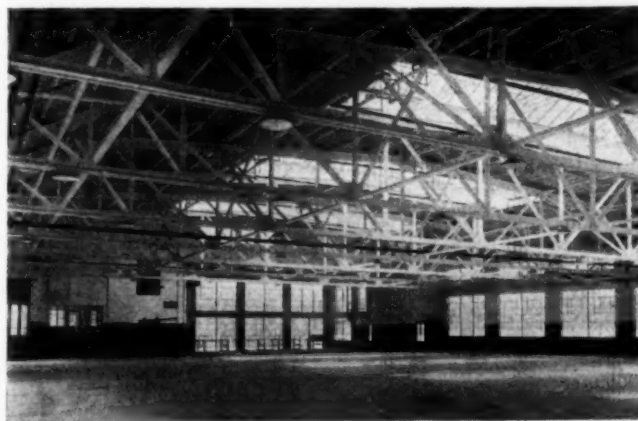
Careful consideration should be given to the number and location of the entrance and exit doors. These factors will depend upon the size of the garage and its location with respect to the adjacent street or streets. In addition to the doors used regularly for operation, consideration should be given to emergency exits which should come into use in the event of fire. The doorways used for regular operation should be from 14 ft. to 18 ft. in width and at least one foot higher than the highest coach to be operated. Doors of ample size will provide for quick entrance and exit and will avoid damage to both the doors and the coaches.

Openings of this size present a problem with respect to the possibility of providing suitable doors that will stay in shape and work properly at all times. Experience has shown that the ordinary swinging or sliding doors of wood, such as have been used successfully in car houses and other buildings, are not suitable for garage use, owing to their extreme size, as the doors get out of shape in a short time, resulting in operating difficulties. It is, therefore, necessary to use doors constructed of all-metal or metal and wood in combination. Doors which slide either horizontally or vertically are preferable to doors which swing, as

in the floor, the top simply being guided, instead of following the old practice of hanging the doors at the top and guiding them at the bottom.

When doors are required through the fire walls between sections of a garage, it is advisable, and is also required by the insurance companies, that the doors be of the automatic closing type.

In order that the door may operate as designed, it is not advisable to make it too wide, and for ordinary purposes it would be well to limit the width to not over

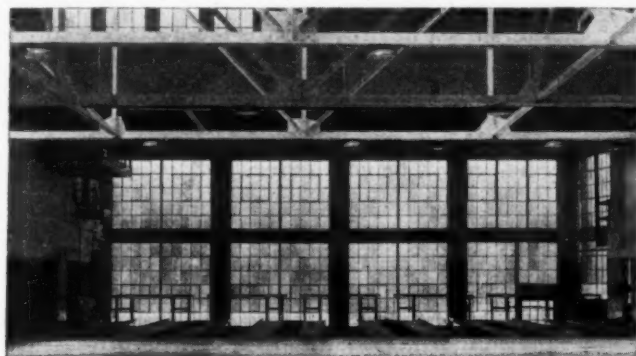


Interior of Dorchester Garage

12 ft.; the height, of course, should be sufficient to provide a few inches clearance above the highest type of coach operated.

#### Inspection Pits

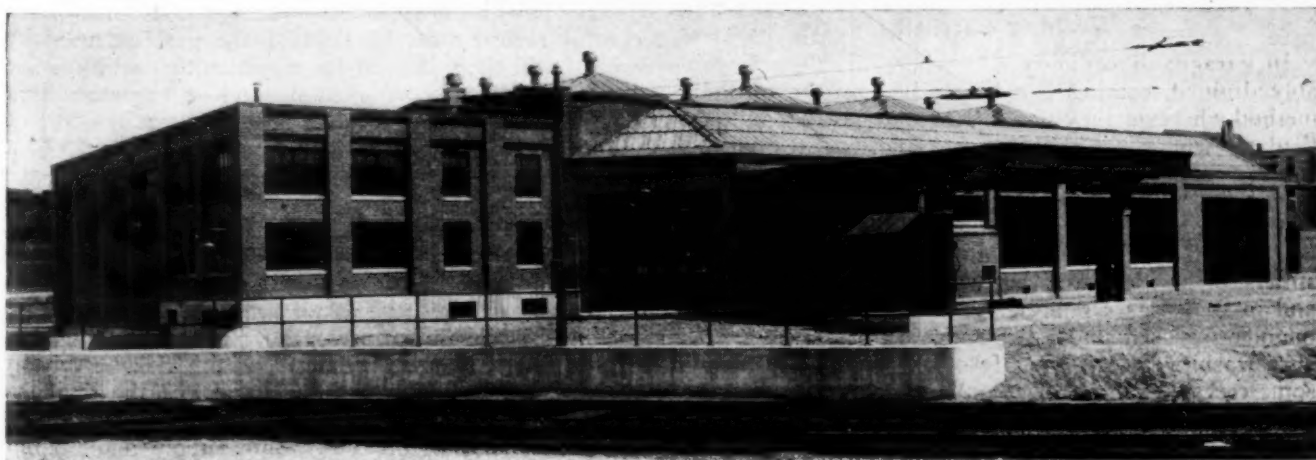
In garages of the latest design, it has been found advisable to provide some form of pit or runway construction upon which coaches may be placed while work is carried on underneath. The simplest form of pit is one which may be described as simply "a hole in the ground with concrete walls around it," but this type, while formerly used, is fast being done away with because of the difficulty of providing suitable ventilation. A better type of pit construction is to provide a large pit of the size required below the level of the main floor. The runways can be constructed of steel, the space underneath the runways being open continuously for the full width of the pit. Plenty of natural ventilation can be provided through shutters near the pit floor level and windows in the outside walls. Additional ventilation may be furnished by means of a duct carried across the head of the pits with a connection up through the



Repair Pits in the Dorchester Garage

they can be operated more quickly and are better suited to mechanical means of operation. Electrically operated entrance and exit doors are in use in many parts of the country and have given very satisfactory results. Such operation can be controlled by means of a push button.

With doors which are designed to slide horizontally, the best results will be obtained if the weight of the door is supported on large wheels running on a track

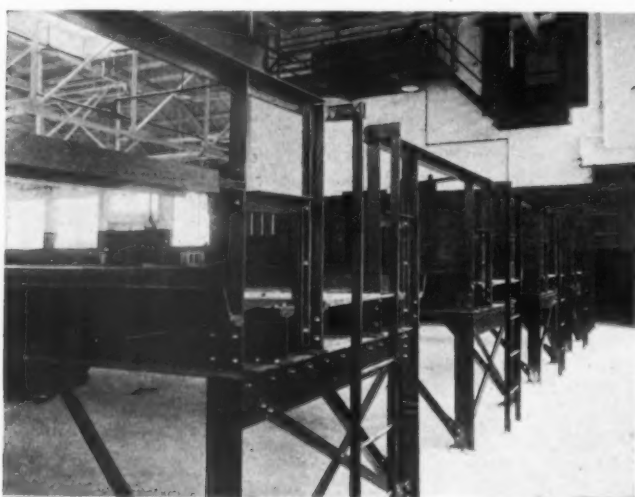


The Dorchester Garage

roof to a ventilator. The duct is provided with outlets, and connection can be made from the exhaust on the coaches to the outlets by means of hose.

The number of pits required for a given number of coaches has not yet been agreed upon. While formerly two or three pits were considered sufficient for 100 coaches, today the tendency is toward a considerable increase. Some of the more recent garage designs provide for 8 to 10 pits for each 100 coaches. One of the pits may be used solely for brake testing and another for oil servicing. It is probable, however, that this ratio (8 to 10 pits for 100 coaches) may be sufficient for ordinary purposes.

The length of the pit to be provided depends on the length of coaches operated. No pit less than 24 ft. long should be provided and possibly the maximum length ought not to exceed 35 ft. It is probable



Detail of Repair Pit Runways, Dorchester Garage

that all of the work on the underside of the coach can be handled in a pit having a length of approximately thirty feet.

The spacing of the pits, center to center, should be sufficient to allow the removal of the rear wheels, together with one-half the rear axle, which requires at least 30 in. from the side of the coach. Taking into consideration the width of the coaches, and other factors, a spacing of 11 ft. will meet every need. With the drop-floor type of pits, a bench placed against the wall on the lower floor level will be very convenient for the workmen.

#### Washing Facilities

In garages of ordinary size where the floor is suitably drained, coaches can be washed by the ordinary method wherever they stand. In larger garages and particularly where it is necessary to wash coaches daily, it is more economical to provide other devices more or less mechanical in their operation, either in a separate room in the garage or in a separate building. The body can be cleaned readily by means of overhead and side sprays, or by the use of hot water under high pressure, and in some cases liquid soap or other cleansing compounds are used under pressure. Probably high pressure washing affects the life of the paint; however, in some cases, steam pressure or kerosene under air pressure has been utilized, particularly for the under parts of the coaches. While the use of a kerosene spray for the chassis gives satisfactory results, it is a bad fire risk and should not be employed in the main garage.

If it is decided to provide a garage with means for making full repairs to coaches, the following requirements are necessary: A well-equipped machine shop and motor-testing room, located conveniently to the pits, provided with a suitable telfer system with which to handle the engines and heavy parts; stockroom; tire-storage space; tire-repairing space; blacksmith shop; wood-working shop; paint shop with suitable storage space; oil storage and oil reclaiming space; upholstery room; battery room; a room for ignition testing and other electrical work, and cleaning equipment, consisting of a dipping tank with an agitator or one of the pressure systems using air and oil, steam or other cleansing compounds.

If painting is to be done by the spraying method, particularly if duco is used, the paint shop must be located so that it can be thoroughly ventilated with a minimum fire hazard.

It is probable that no transportation system would decide to provide a complete repair shop in each garage, but it is reasonable to assume that a repair shop would be constructed to serve the entire system, in which case it should be suitably located with respect to the entire system. It can be combined with a garage at that point if desirable.

If a garage is intended to be a complete operating unit, quarters must be provided for the operating force, and there may be required, in addition to the superintendent's office, a receiver's office, quarters for the starter and station master, a suitable lounging room, wash room and locker rooms, and in extreme cases an assembly hall might be considered.

#### Gasoline and Oil Equipment

Means for fueling coaches in many cases, have been placed inside the garage and sometimes near the entrance and exit doors. This practice should not be followed as it increases the fire risk. When located near the doors, coaches entering and leaving the garage are delayed. The best practice is to locate the apparatus for fueling outside in the yard, preferably with the gasoline pumps on a raised concrete platform, so located that the greatest number of coaches can stand to fill at the same time without interfering with the operation of coaches entering or leaving the garage. In such cases, the pumps and other apparatus should be suitably protected from the weather by an overhead canopy.

There are several methods of handling gasoline, including hand pumps, electrically and pneumatically-driven pumps, air systems and systems whereby the gasoline is floated on water from the tanks, all of which devices have been used with satisfactory results. As a careful record must be kept of the gasoline used by each coach, there is need for a system that will provide for quick delivery of gasoline and at the same time accurately measure the flow. The electrically-operated pump of the continuous flow type, or the air and the hydraulic systems probably meet the requirements equally well.

There are several types of nozzles on the market, designed to reduce waste. In some cases an ordinary globe valve is used at the end of the filling hose, which leaves a pressure on the hose at all times. Any accident to the hose while under pressure will cause serious loss of gasoline as well as a dangerous fire risk. Probably the best method to date to take care of the difficulty is a lever-controlled nozzle which operates by air, turning on and shutting off the gasoline supply at the pump.

The oiling of coaches does not result in a dangerous fire hazard and can be handled satisfactorily inside the



garage. Oiling does not require that coaches stand at pumps or at a given location. This work is usually done at night, the oil being distributed from wheel buggies and used in relatively small amounts in each coach.

Suitable oil equipment can be provided by purchasing any of the standard makes of storage systems, the size of which will depend upon the number and kinds of oil to be carried, as well as the capacity required. In large garages where a considerable quantity of oil is used, it will be found economical to reclaim the oil by a simple distilling process.

Compressed air for inflating tires and for the operation of small machine tools such as valve grinders, etc., is necessary in a garage. In recent installations, a complete system for compressing, cooling and storing air, has been provided with pipe lines and outlets conveniently located at various points in the garage, delivering air at a pressure from 125 lb. to 150 lb. per square inch.

#### Heating and Ventilation

The method of heating and ventilating a garage should be carefully considered. The heating requirements do not differ materially from those of any large building area, and satisfactory means can be provided by the use of direct steam radiation or by unit-type heaters either placed on the floor or hung from the ceiling.

A number of large garages are now being heated economically by a suitable number of unit heaters hung from the ceiling. The advantage of this method of heating over the ordinary method of column or pipe radiation is that the element of damage on account of the coaches striking the heating apparatus is eliminated. There are varying opinions, however, as to the use of the unit heating system, but it is doubtful whether any real fire hazard is created by circulating gasoline vapors throughout the building. The garages which are heated by this means are experiencing no difficulties. In the writer's opinion, if proper ventilation is provided, satisfactory results will be obtained from unit heaters.

The question of providing ventilation in a garage is not serious except in garages several stories in height and particularly garages with basements. It is not possible in garages several stories in height to ventilate at the ceiling except in the top story. In garages having a small floor area, ceiling ventilation might be provided by means of ducts running from near the ceiling level up to and through the roof. In garages with large floor areas, and in basement garages where there is very little, if any, side ventilation, as well as no ceiling ventilation, it will be found advisable to install a suitable forced ventilation system both to remove the foul air and to bring in fresh air.

The modern one-story garage can be ventilated readily without the use of mechanical apparatus, by providing a maximum of window ventilation and a generous number of large-sized ventilators in the roof, as well as ventilation registers at frequent intervals in the outside walls at the floor level.

Ventilation is required particularly when the coaches are being warmed up prior to leaving the garage, but this period is comparatively short so that it has been found practicable to keep the doors open, and in such cases the additional ventilation provided has been found sufficient.

In addition to providing ample natural light, ample lighting both for general illumination and by means of

portable lights should be provided. Satisfactory results for general illumination have been obtained by providing lights hung directly from the bottom chord of the trusses, using 100-watt lamps with 18-in. white enamel reflectors, the lights being spaced approximately 16 ft. apart. Outlets for extension lights should be provided in the walls at intervals of about thirty feet. In the repair section of the garage, more illumination is necessary and lights should be installed in sufficient number to meet the needs of the particular layout.

#### Provision for Fire Protection

Ample fire protection should be provided by means of a standard wet sprinkler system, supplemented by hand fire extinguishers, sand pails and portable foam-type fire extinguisher engines. At least one of the portable foam-type engines should be provided for each 20,000 sq. ft., of floor area. In the repair section, where considerable wood-working may be done, fire hose also is desirable. It is also advisable to provide fire alarm boxes connected with the city fire alarm system in order that an alarm may be given, in the event of fire, in the shortest possible time.

### P. R. R. Gets Its Charter

THE Governor of Pennsylvania has approved the grant of a charter to the Pennsylvania General Transit Company, a subsidiary of the Pennsylvania Railroad. The new company has charter powers to operate on the highways of the state a common carrier service for both passengers and freight. Application for this charter was refused in 1926 by the then governor of the state, Gifford Pinchot, who refused a similar grant to a highway subsidiary of the Reading.

Upon the inauguration of the present governor, the Reading renewed its application for a charter for its highway subsidiary. Opponents brought the case into the courts and the Reading won, whereupon the governor approved the charter for the Reading subsidiary several months ago. The Pennsylvania application was then renewed and has now been approved following the precedent set in the case of the Reading.

The Pennsylvania's subsidiary now has pending before the Public Service Commission of Pennsylvania an application for authority to parallel its entire main line across the state from the New Jersey to the Ohio boundary with a highway motor coach route.

THE STATE OF KANSAS LEADS all others for the density of automobiles per mile of its highways according to the results of a survey recently completed by the American Motorists Association. The figures show that the five leading states, from a standpoint of automobiles registered per mile are: Kansas with 159.2; Oklahoma, 158.2; Rhode Island, 130.6; Nebraska, 97.1; and New Jersey, 86.8.

The state of Alabama, with 13.7 automobiles per mile, has the fewest number of vehicles on its highways, followed by Nevada with 14.7; Idaho, 15.1; South Carolina, 15.2; and North Carolina with 15.5.

The survey was made to show the strides being made by the states in the construction of their highway building programs. Indiana, it is pointed out, leads all other states in this respect, having a total of 49,633 miles of improved highways and is expending this year, for further highway improvements, an average of \$51 for each automobile registered in the state. Other leading states, from a highway construction standpoint are: Ohio, with 42,655 miles; Minnesota, 30,200; North Carolina, 27,646; and New York, 27,306 miles.

# The New British Railway Motor Transport Law

*Enactment authorizes large railways to operate on practically all highway routes, with some regulation*

THE British railways have been granted authority by Parliament to provide highway transportation, in their respective territories, virtually without restriction. They may, with few exceptions, operate motor coaches or trucks on regular routes anywhere, regardless of independent operations which may have preceded them in the field. There are certain regulations as to filing of tariffs, competition with local tramways etc. which must be complied with. A separate law was enacted for each of the four grouped companies: the London, Midland & Scottish, the London & North Eastern, the Great Western and the Southern. These laws are practically identical and the one reproduced herewith, that of the Great Western, shows the powers, as well as the restrictions and responsibilities, applying to all four systems. An article setting forth the railways' attitude on this question and the contest which preceded the granting of these powers appeared in the *Railway Age* of September 22, page 549.

*An Act to empower the Great Western Railway Company to provide road transport services; and for other purposes.*

[Royal Assent 3rd August 1928.]

Whereas it is expedient that the Great Western Railway Company should be empowered to provide transport services by road and to apply their funds for the purposes of this Act:

And whereas the objects of this Act cannot be attained without the authority of Parliament: *May it therefore please Your Majesty*, That it may be enacted and be it enacted by the King's Most Excellent Majesty by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled and by the authority of the same as follows (that is to say):

1. This Act may be cited as the Great Western Railway (Road Transport) Act 1928.

2. In this Act unless the context otherwise requires: the expression "the Company" means the Great Western Railway Company; the expression "merchandise" includes goods, minerals, live stock and animals of all descriptions; the expression "the Minister" means the Minister of Transport; the expression "trader" includes any person sending or receiving or desiring to send or receive merchandise by road; and the expression "representative body of traders" includes the authorities and bodies mentioned in paragraphs (a) and (b) of Sub-section (1) of Section 78 of the Railways Act 1921.

## Broad Powers Granted

3. The Company may provide, own, work and use road vehicles to be drawn or moved by animal, electrical or mechanical power in any district to which access is afforded by the system of the Company or the system of any Railway Committee owning or operating a railway on which Committee the Company is represented and may by means of such vehicles convey by road passengers and passengers' luggage, parcels and merchandise:

Provided that the Company shall not in pursuance of this Act convey by any road vehicle any passenger who on any one journey is both taken up and set down in the area consisting of the Metropolitan Police District and the City of London.

4. (1) In this section the expression: "local area" means a county, city, borough or urban district; "local authority" means the council of a local area and includes a joint board of local authorities constituted by Act of Parliament prior to the passing of this Act, such joint board being deemed (a) to be the local authority of a local area consisting of the local areas of the constituent authorities of the board in respect of the tramways or omnibus services of such joint board within that area, and (b) to work the tramways or provide the omnibus

services of such joint board therein; "tramway" includes "light railway" and "trolley vehicle system"; and "tramcar" includes "trolley vehicle."

(2) If and so long as—(a) an adequate and satisfactory service of tramcars is provided along a tramway situated in a local area as existing at the passing of this Act which tramway is at the passing of this Act owned or worked by the local authority of such local area; or (b) an adequate and satisfactory service of omnibuses is provided in pursuance of existing statutory powers in a local area as existing at the passing of this Act by the local authority of such local area the Company shall not without the consent of the local authority of such local area run or enter into any agreement for the running of any service of road vehicles in such local area in competition with any such service of tramcars or omnibuses as the case may be except for the purpose of serving any area beyond such local area so long as no passenger conveyed by such service of road vehicles is on any one journey both taken up and set down on a route in such local area in competition with such service of tramcars or omnibuses as the case may be.

(3) Any question as to whether an adequate and satisfactory service of tramcars or omnibuses is provided as aforesaid or whether there is or would be such competition as aforesaid shall be determined by the Minister whose decision shall be final.

(4) The tramways in the County of Middlesex now belonging to the Metropolitan Electric Tramways Limited in respect of which powers relating to the future purchase thereof have been conferred upon the Council of that County shall for the purposes of this section be deemed to be tramways owned by that Council.

(5) Where a local area will be altered by virtue of an Act passed in the present session the alteration shall for the purposes of this section be deemed to have been made before the passing of this Act.

## Comply With General Motor Vehicle Laws

5. The Company shall not permit any road vehicle run in pursuance of this Act to use any bridge maintainable by the Company or any Railway Committee on which the Company is represented, the use of which under like circumstances is prohibited by the Company or such Committee to similar vehicles which are not run in pursuance of this Act.

6. (1) When any regular service (including an experimental service) of road vehicles has been provided by the Company under this Act the Company shall forthwith give notice thereof to the Minister for the purposes of record.

(2) No service in respect of which such notice has been given (other than an experimental service) shall be withdrawn until the Company shall have published notice of intention to withdraw such service in the "London Gazette" and in such other manner as the Minister shall prescribe, stating the mode in which and the time within which objection to such withdrawal may be made by any representative body of traders or any local authority (including a county council) in whose area such service is provided and if any such objection shall be made and is proceeded with the service to which such objection relates shall not be withdrawn without the consent of the Minister.

(3) A regular service of road vehicles which is provided for a particular part of every year shall not be deemed to be withdrawn so long as it is run for the same or substantially the same part of every consecutive year.

(4) If the Company withdraw any regular service of road vehicles (other than an experimental service) without the consent of the Minister they shall for each offence and in the case of a continuing offence for every day during which the offence continues after conviction be liable on summary conviction to a fine not exceeding five pounds.

(5) Any question as to whether a service is a regular service or is an experimental service shall be determined by the Minister.



7. The Company shall not manufacture or apply their funds to the manufacture of any part of any road motor vehicle provided under this Act other than the body of such vehicle.

8. (1) The Company may demand and take in respect of traffic conveyed in pursuance of this Act such reasonable fares, rates and charges as they may think fit.

(2) In cases where a regular service of road vehicles is provided by the Company for the conveyance of merchandise a record of the rates and charges for such conveyance for the time being demanded and taken by the Company shall be kept at the railway station or depot of the Company at which or nearest to any place at which merchandise is accepted for conveyance by such service and such record shall during all reasonable hours be open to the inspection of any person interested without the payment of any fee:

Provided that if the Company fail to comply with the provisions of this subsection they shall for each offence and in the case of a continuing offence for every day during which the offence continues after conviction be liable on summary conviction to a fine not exceeding five pounds.

#### Patrons or Authorities Have Recourse on Rates

(3) If any local authority (including a county council) interested in any of the passenger fares charged in connection with a road service provided by the Company shall consider any of such fares to be unreasonable or if any representative body of traders shall consider the said rates or charges as so recorded or any of them to be unreasonable or if any trader interested in any particular rate or charge as so recorded shall consider that rate or charge to be unreasonable such authority, body or trader may from time to time apply to the Railway Rates Tribunal (in this section referred to as "the Tribunal") to reduce the said fares, rates or charges or the particular fare, rate or charge in respect of which complaint shall be made and such application shall be published in such manner as the Tribunal may prescribe and the Tribunal after hearing all parties whom they consider entitled to be heard may make such modifications in the said fares, rates and charges or any of them as to the Tribunal may seem just and shall fix a day upon which the modifications are to come into force.

(4) If after any such modifications shall have come into force circumstances shall arise which in the opinion of the Company render the said fares, rates or charges or any of them as so modified unreasonable the Company may apply to the Tribunal for a review thereof and such application shall be published in manner aforesaid and the Tribunal after hearing all parties whom they consider entitled to be heard may review such fares, rates and charges or any of them and make such modifications therein as to the Tribunal may seem just.

(5) Sections 22 and 26 of the Railways Act 1921 shall apply in relation to the carrying into effect of the duties and powers of the Tribunal under this section.

#### Fare List to be Posted

9. A list of fares to be demanded and taken in respect of the conveyance of passengers in any road vehicle provided by the Company under the powers of this Act shall be exhibited in a conspicuous position inside such vehicle.

10. (1) The Company shall perform in respect of the road vehicles which they provide, own, work and use under the powers of this Act when being provided, worked or used on a regular service and moved by electrical or mechanical power such services in regard to the conveyance of mails as are prescribed by the Conveyance of Mails Act 1893 in the case of a tramway to which that Act applies.

(2) Every road vehicle moved by electrical power shall be so equipped and worked as to prevent any interference with telegraphic communication by means of any telegraphic line (as defined by the Telegraph Act 1878) belonging to or used by the Postmaster-General.

#### May Co-operate With Independent Operators

11. (1) The Company on the one hand and any local authority, company, body or person owning or running road vehicles for hire or as public service vehicles for the carriage of passengers, parcels or merchandise on the other hand may enter into and carry into effect agreements for all or any of the following purposes (that is to say): (a) The working, user, management and maintenance by any of the contracting parties of any road vehicles, lands, houses, depots, buildings, sheds and property provided in connection with any road transport services which the Company are empowered to provide; (b) The supply by any of the contracting parties under and during the continuance of any such agreement of road vehicles and conveniences in connection therewith necessary for the pur-

poses of such agreement and the employment of officers and servants; (c) The interchange, accommodation, conveyance, transmission and delivery of traffic conveyed or to be conveyed within any district in which the Company are empowered to provide road transport services and the payment, collection and apportionment of the fares, rates and charges and other receipts arising from any such service;

Provided that as regards an agreement made between the Company and a local authority in pursuance of this section nothing in this section shall authorise the provision or maintenance of a road transport service under such agreement by the contracting parties or either of them except—(i) upon routes along which the local authority have powers under or in pursuance of an Act of Parliament to provide omnibus services; and (ii) subject to any statutory limitations, restrictions or obligations imposed on the local authority in respect of the exercise of such powers.

#### Financial Arrangements

(2) In order to provide or facilitate the provision of funds for the establishment or maintenance of a road transport service under an agreement made for any of the purposes specified in paragraph (a) or paragraph (b) of Subsection (1) of this section and to the extent requisite therefor the Company may (i) contribute any moneys which may be necessary, (ii) hold stock, shares and securities of any of the contracting parties, and (iii) guarantee the dividends or interest on stock, shares and securities of any of such parties.

(3) Forthwith after the making of any agreement under this section the Company shall give notice thereof to the Minister specifying the names of the parties thereto and whether or not such agreement is an agreement whereby the business of any company, body or person is controlled by the Company through shareholding or nomination of directors or as the result of a loan or other financial transaction or otherwise.

(4) Any road transport service provided by a company, body or person whose business is for the time being controlled by the Company whether through shareholding or nomination of directors or as the result of a loan or other financial transaction or otherwise shall for the purposes of the sections of this Act of which the marginal notes are "For protection of transport services of local authority in own area," "Services to be notified to and not to be withdrawn without consent of Minister," "Fares, rates and charges," and "List of fares to be exhibited," be deemed to be a road transport service provided by the Company.

(5) Nothing in this section shall authorise the making of an agreement for providing, working or using road vehicles for the conveyance of passengers who on any one journey are both taken up and set down in the area consisting of the Metropolitan Police District and the City of London.

12. The provision, owning, working and use of vehicles by the Company in pursuance of this Act and the provision of funds, the holding of stock, shares and securities and the payment of moneys under any guarantee under or in pursuance of this Act shall be deemed to form an ancillary or subsidiary business carried on by the Company within the meaning of Subsection (6) of Section 59 of the Railways Act 1921.

13. If the Minister is at any time of opinion that the interests of the public are prejudicially affected by the exercise of the powers of this Act he may give to the Company notice in writing thereof and of the reasons upon which that opinion is founded and may direct a public inquiry to be held at which all parties whom he considers entitled to be heard shall be given an opportunity of being heard. If after such inquiry the Minister shall still be of the said opinion and the Company shall not within such period as he may direct make provision to his satisfaction for the protection of the interests of the public then the Minister shall report to both Houses of Parliament.

#### Accounting

14. (1) The accounts to be rendered by the Company under the Railway Companies (Accounts and Returns) Act 1911 shall include particulars—(a) of receipts and expenditure of the Company in respect of the provision owning, working and use of vehicles by them in pursuance of this Act; (b) of the amount of any funds provided and stock, shares and securities held by the Company under or in pursuance of the section of this Act of which the marginal note is "Working agreements etc." and of the revenues arising from any funds so provided and stock, shares and securities so held; and (c) of moneys paid by the Company under any guarantee under the said section.

(2) The Company shall also prepare and furnish annually to the Minister in such form as he may prescribe a statement of account relating to the ancillary or subsidiary business established under this Act and shall include therein an account of the net revenue resulting from such business and of the capital employed therein.

(3) The said particulars and statement of account shall be compiled in such manner as may be determined under the provisions of Section 77 of the Railways Act 1921 and that section (other than Subsection (2) thereof) shall apply to such particulars and statement of account and to the Company in respect thereof.

(4) The Company shall compile and render to the Minister the statistics and returns set out in the Schedule to this Act subject to such variations thereof as may from time to time be agreed between the Minister and the Company or as may be determined by the Minister after reference to and considering the report thereon by the Committee referred to in Subsection (1) of the said Section 77 and Subsection (3) of that section shall apply to such statistics and returns and to the Company in respect thereof.

15. The Company may apply their funds to the purposes of this Act and may appropriate and apply to such purposes being purposes to which capital is properly applicable any of the moneys which they have raised or are authorised to raise and which may not be required for any purpose to which they are by any existing Act made specially applicable.

16. (1) Nothing in this Act (except the section thereof of which the marginal note is "Repeal") shall exempt the Company from the provisions of any Act of Parliament passed or to be passed or of any order, byelaw, regulation or scheme made or to be made thereunder nor shall anything in this Act limit, extend or affect the operation of Section 49 of the Railways Act 1921.

(2) Without prejudice to the generality of the provisions of Subsection (1) of this section nothing in this Act shall affect the powers under the London Traffic Act 1924 or any Act amending the same of the Minister or any licensing authority or shall confer on the Company any privilege or exemption in relation to the exercise of those powers.

17. (1) In respect of the exercise of any powers or duties conferred on the Minister or the giving by him of any consents under this Act the provisions of Part I of the Board of Trade Arbitrations &c. Act 1874 shall apply as if the Minister were referred to therein in lieu of the Board of Trade and as if in Section 4 of that Act the words "under the seal of the Minister of Transport" were substituted for the words "by writing under the hand of the President or of one of the Secretaries of the Board."

(2) The provisions of Section 20 of the Ministry of Transport Act 1919 shall apply to all inquiries held or to be held by the Minister under this Act as though such inquiries were held for the purposes of that Act.

18. The following enactments are hereby repealed: [These acts authorized highway services at particular points on particular railways and are no longer needed under the general authority granted herein.]

19. All costs charges and expenses of and incident to the preparing for obtaining and passing of this Act or otherwise in relation thereto shall be paid by the Company.

## The Use of Spark Plug Testing Machines

By H. Rabezzana

Chief Spark Plug Engineer, AC Spark Plug Company

**T**HERE are two principal kinds of spark plug testing devices in use. One is the spark plug testing stand and the other is the compression box. There are many variations of these types, but they all operate on one or the other of these principles.

The spark plug testing stand consists of a small stand on which plugs are tested in about the same way as the dealer tries out an electric light bulb to see that it lights before selling it to a customer. The spark plug is laid on the stand and the terminal connected to a coil and batteries. The current is turned on, causing the plug to spark at the gap. This test is made in the open

air, that is, without compression, and about the only thing that will cause the plug not to fire is when it is fouled badly.

A plug which fires satisfactorily on this testing machine may not fire at all, or may miss badly, when placed in the motor. This method of testing will not, necessarily, show up even broken insulators. Sometimes when the plug is placed in this device, the gap is opened very wide on the theory that this wide gap sets up a resistance equivalent to that set up by the compression of the motor, but this is not so. The resistance set up by the compression of the motor is greater than could be equalled by spreading the spark points as far as it is possible to do.

This same type of test is often made by taking one plug out of the cylinder and laying it on top of the engine. The procedure and results are the same as on the testing stand.

There are many types of compression-box spark plug testers, but in principle they are all similar. The device consists of an air-tight box with a window; one or more spark plug holes, an air-pressure gage, electrical connections and an air valve.

The spark plugs are screwed tightly into the spark plug holes; the spark plug terminals are connected to the coil and a battery, a ground connection made, and the current turned on. Then air is forced through the air valve by a hand or mechanical air pump, and the pressure is increased to the point that the density of the compressed air inside the box kills the spark; that is, the air becomes so heavily condensed that the electric current is no longer strong enough to force the spark through it at the gap of the plug.

A test with such a box consists of recording at what air pressure the plug tested ceases to fire. The gap width has everything to do with the results shown by a test of this kind. Higher compressions require narrower spark gaps because of the extra resistance set up by the high compression. If, therefore, the gap of the plug to be tested is not set narrow enough to fire at the highest compression to be used in the test, the plug may fail to fire above a certain pressure—not because there is anything wrong with the plug, but merely because the gap needs adjusting to the proper width for the compression used.

Variations of even a few thousandths of an inch in the spark gap may cause several plugs of the same type and make to show different results under extreme conditions. For average driving, a gap set with an ordinary gap gage is sufficiently accurate; but, for unusual conditions, such as to be sure that every plug has an equal chance to fire uniformly under the same extreme compression, the spark gap should be set only with precision instruments and even the very best of these are not accurate enough to guarantee absolutely uniform results.

Spark plug testing devices are not practical because they do not duplicate actual engine conditions. The ignition system usually used with the testers is not the same; heat, oil and explosive impact are not considered. Also the individual requirements of various makes of motors are entirely ignored and, most important of all, they furnish no information regarding performance over a period of time.

Spark plug testing devices cannot be successfully used to test spark plugs for engine-operating efficiency, or as a means of showing the efficiency of a spark plug. Such tests are misleading and may cause serious spark plug errors. The only real test of a spark plug is in the engine.



# Record Attendance at Motor Transport Meeting

*One hundred and nine officers representing 127 railways gather in Detroit for opening session of convention*

WITH an attendance exceeding that at any previous meeting, the first annual meeting of the Motor Transport Division, A. R. A., opened in the Book-Cadillac Hotel, Detroit, Mich., last Wednesday, October 24. One hundred and nine officers representing the executive, operating, traffic, legal, mechanical and other departments of 127 railways were present as A. P. Russell, chairman of the division, took the chair.

The meeting was marked by animated discussion of the topics which came up for consideration. Motor truck competition and means of meeting it received extended attention during the morning program on Wednesday and aroused considerable difference of opinion among the delegates.

Chairman Russell opened the meeting with a brief discussion of the progress which has been made in enlisting the united support of motor vehicle manufacturers and operators for the passage by congress of legislation placing interstate operators on the highways under regulatory supervision. He disclosed that discussions of this subject had been held by representatives of the American Electric Railway Association and the American Automobile Association in Cleveland last month. The manufacturers are to hold a similar meeting after the conclusion of the Motor Transport Division meeting and out of these conferences a joint committee will be formed to bring all the interests into agreement.

Mr. Russell described briefly the regional organization of the Division and stated that nearly every railroad in the country now has specially appointed representatives on one or more of the Division's committees. He particularly remarked the increased interest being taken by the railways in the affairs of the Division as evidenced among other things by the large representation at this meeting.

The first day's program was rearranged to make the reports of the Motor Truck Section the first business of the meeting. The reports of the Motor Coach Section were to be taken up on Wednesday afternoon, followed on Thursday and Friday by the reports of the Law Committee and the Rail Motor Car Section in that order.

A full report of the proceedings at the meeting will be published in the *Motor Transport Section* of November 24.

Each of the three sections of the Motor Transport Division had perfected its organization prior to the meeting and had prepared a thorough program of subjects for discussion. The program follows:

## October 24

(A. P. Russell, Chairman, Motor Transport Division, Presiding.)

Report of General Committee—A. P. Russell, Chairman.

Report of Law Committee—R. N. Van Doren, Chairman.

## Motor Coach Section

(T. B. Wilson, Chairman, Motor Coach Section, Presiding.)

Reports will be presented on the following subjects:

1. Report of Motor Coach Section relative to Endorsement of the Uniform Motor Bus Specifications Code fostered by the Society of Automotive Engineers and the National Automobile Chamber of Commerce (Motor Truck and Motor Bus Members).
2. Should Motor Coach Service inaugurated by Railroads, in coordination with or supplementary to rail service, be operated by a subsidiary company, with its own officers and employees, or as a department of the railroad?
3. Commission Agents—
  - (a) Necessity of.
  - (b) Selection of.
  - (c) Location of.
  - (d) Education of.
  - (e) Bonding of.
  - (f) Compensation.

Discussion on the following motor coach problems submitted by the Members:

1. Transcontinental motor coach service between the East and the West
2. Rates, divisions, etc., involved in case through tickets should be used in the future.
3. Co-ordinated bus and rail service.
4. Terminal situations in principal cities.
5. Operating and mechanical costs, as well as any other operating or maintenance matters which might seem desirable.

## October 25

## Rail Motor Car Section

(R. L. Fairbairn, Chairman, Rail Motor Car Section, Presiding.)

Reports will be presented on the following subjects:

1. Terminal Handling of Motor Cars and Motor Trains.
2. Reliable formula on which to base a decision as to whether or not the purchase of self-propelled equipment to replace a steam train is justified.
3. Reliability of gas-electric rail cars and form of statement for reporting operating costs.
4. Seats.
5. Observation Car.
6. Distribution of Rail-Motor Cars so as to provide maximum mileage.
7. Design of Rail-Motor Car that will tend to increase revenue.
8.
  - (a) Size and kind of gas-electric cars best suited for main and branch line service.
  - (b) Possibility of operating cars of this type in switching service in terminals where electrification is being agitated.
9. Factors necessary to determine when it is economical to substitute motor cars for steam service.
10.
  - (a) What can be done to increase passenger, express or mail revenue on passenger motor cars, giving consideration to complaints of the public.
  - (b) Transportation costs.
  - (c) Mileage per motor car per day.
11. Increased scheduled train service by the operation of motor cars at frequent intervals to increase traffic.
12. Operation of Motor Cars in mixed train service.
13. Operation of Motor Cars in freight service.
14. Is the Mechanical transmission type of self-propelled passenger car obsolete? If so, why?

Discussion of the following Rail-Motor Car problems:

1. Method of heating the car and train.
2. Lighting of the train.
3. Future needs in motor car development, with reference to the train personnel and the possibility of one man operation.

#### October 26 Morning Session

##### Motor Truck Section

(G. C. Woodruff, Chairman, Motor Truck Section, Presiding).

1. Opening remarks by Chairman.
2. Brief reports by the Regional Chairmen, as follows:  
Region No. 1—C. J. Chenworth, Engr. Asst. to V. P. & G. M., Atlantic Coast Line.  
Region No. 2—P. J. Neff, Asst. to President, Missouri Pacific.  
Region No. 3—  
Region No. 4—Paul P. Hastings, G. F. A., A. T. & S. F.  
Region No. 5—J. P. O'Brien, General Manager, Oregon-Washington R. R. & Navigation Co.  
Region No. 6—M. F. Steinberger, Special Engineer, B. & O.  
Region No. 7—James L. Hill, Supervising Agent, Long Island.
3. Discussion of Questionnaire submitted through Regional Chairmen.
4. Discussion of proposed Questionnaire covering loss of business and best means of regaining it.
5. Discussion of any motor truck problems submitted by the members.
6. General discussion.

#### Afternoon Session

Joint Conference with representatives of the Automotive Industry for the discussion of matters of mutual interest.

##### Truck Section's Questionnaire

The questionnaire referred to in the program of the Motor Truck Section was designed to secure from all railroads complete information regarding the nature and extent of truck competition in their various territories and to learn also the nature and extent of motor truck operations by the various railroads; also to bring about ways and means to meet the competition of independent truck operators.

The afternoon session of October 26 was an open meeting to which representatives of the automotive industry and other interested persons were invited to attend and join in the discussion. This open session was inaugurated at the last convention of the Motor Transport Division in Atlantic City in June and was so well attended that the institution was continued for the Detroit meeting, at which an even larger attendance of interested persons outside the railroad field was expected.

##### Regional Organization Perfected

The regional sub-divisions of the work of the various committees of the association has been perfected. The various regions are as follows: No. 1, the South-eastern states; No. 2, the states including Nebraska and Southern Iowa southward to the Gulf; No. 3, Northern Iowa, Wisconsin, Minnesota and the Dakotas; No. 4, Colorado, New Mexico and states westward to the coast; No. 5, Wyoming, Montana, Idaho, Oregon and Washington; No. 6, Ohio, Indiana, Illinois, and Michigan; No. 7, Maryland and Pennsylvania and all states northeast thereof. In Canada all territory west of Port Arthur, Fort William and Armstrong is included in region No. 3, while territory east of this point is divided between regions 6 and 7.

Each region has a chairman for each section. The regional chairmen for the Motor Truck Section are given in the program for the meeting of that section.

The regional chairmen of the Motor Coach Section are as follows: No. 1, E. S. Moore, general superintendent of transportation, Norfolk & Western; No. 2, W. M. Fenwick, general passenger agent, Missouri-Kansas-Texas; No. 3, E. W. Lollis, general superintendent, Chicago, Milwaukee, St. Paul & Pacific; No. 4, R. H. Clarkson, Santa Fe Transportation Company; No. 5, R. H. Crozier, general passenger agent, Spokane, Portland & Seattle; No. 6, R. H. Allison, assistant to general manager, Big Four; No. 7, R. J. Littlefield, manager motor coach service, Boston & Maine.

The regional chairmen of the Rail Motor Car Section are: No. 1, L. B. Burns, assistant to general manager, Seaboard Air Line; No. 2, E. Wanamaker, electrical engineer, Rock Island; No. 3, E. W. Lollis, general superintendent, Chicago, Milwaukee, St. Paul & Pacific; No. 4, G. L. Whipple, general superintendent of transportation, Union Pacific; No. 5, George McCormick, general superintendent of motive power, Southern Pacific; No. 6, H. M. Eicholtz, assistant general manager, Chicago & North Western; No. 7, J. K. McNeillie, superintendent, Delaware & Hudson.

These regional chairmen form, with the chairmen of each section, the division's committee in charge of each of the three sections. T. B. Wilson, vice-president and manager of the Southern Pacific Motor Transport Company, is chairman of the Motor Coach section; G. C. Woodruff, assistant freight traffic manager of the New York Central, is chairman of the Motor Truck Section and R. L. Fairbairn, manager of the passenger service bureau of the Canadian National, is chairman of the Rail Motor Car Section.

##### The General Committee

A. P. Russell, vice-president of the New Haven and chairman of the Motor Transport Division, heads the general committee. Its other members are the three sectional chairmen named above and in addition the following: H. F. Fritch, passenger traffic manager, Boston & Maine; A. Hatton, general superintendent of transportation, Canadian Pacific; C. S. Lake, special assistant to the president, Chesapeake & Ohio; G. W. Lupton, assistant to vice-president, Santa Fe; P. J. Neff, assistant to president, Missouri Pacific; R. K. Stackhouse, general superintendent stations, transfers and motor service, Pennsylvania; R. N. Van Doren, vice-president, Chicago & North Western.

The Motor Coach Sectional committee has several members in addition to the sectional chairmen and regional chairmen. They are: C. B. Foster, passenger traffic manager, Canadian Pacific; S. F. Hobbs, general manager, New England Transportation Company; E. D. Osterhout, passenger traffic manager, Reading; M. F. Steinberger, special engineer, Baltimore & Ohio; G. L. Whipple, general superintendent transportation, Union Pacific.

##### Law Committee

In addition to the general committee and the sectional committees, the division also has a Law Committee under the chairmanship of R. N. Van Doren, vice-president, Chicago & Northwestern. Other members of this committee are as follows: M. L. Bell, vice-president, Rock Island; S. T. Bledsoe, general counsel, Santa Fe; G. J. Brownell, vice-president, Erie; R. J. Cary, vice-president, New York Central; A. H. Elder, general solicitor, Jersey Central; C. B. Heiserman, vice-president, Pennsylvania; E. S. Jouett, vice-president, Louisville & Nashville; A. P. Russell, vice-president, New Haven.



# S. A. E. Holds Transportation Meeting at Newark

*Sessions on long hauls, economics and store-door delivery attract railroad men*

THE Society of Automotive Engineers held a transportation meeting on October 17-19 at the Robert Treat Hotel, Newark, N. J. This meeting was well attended—over 400 members and guests registering. Sessions were held morning, afternoon and evening, the first day's sessions being on the subjects of motor coach transportation, business of transportation and motor haulage. The session on Thursday morning, October 18, was a symposium on design vs. legislation. The afternoon session was devoted to the presentation of seven committee reports on operation and maintenance. A transportation banquet was held in the evening at which Dr. Miller McClintock, Erskine Bureau of Street Traffic Research, spoke and brief addresses were made by the president of the society, W. G. Wall, and a number of others prominent in the automotive field.

Only two sessions were held on Friday. The subject for the morning session was store-door delivery, during which a paper on Canadian store-door delivery of today was presented by R. A. C. Henry, director, Bureau of Economics, Canadian National. Prepared discussions of Mr. Henry's paper were presented by H. M. Taylor, president, United States Trucking Corporation, and representatives of the railroads. Although the meeting was officially closed with the session Friday afternoon, arrangements were made to inspect the plant and traffic control of the Holland Tunnels on Saturday morning, October 20. This trip was well attended.

A paper of special interest to railway motor coach and truck operators was presented by G. W. Daniels, United States Trucking Corporation, whose paper was entitled Getting and Holding Business for the Motor Truck, in addition to the paper by Mr. Henry, Canadian National. A paper on Long-Haul Transportation, by W. E. Travis, California Transit Company, was scheduled for the Wednesday morning session. Mr. Travis, however, was unable to attend the meeting and F. C. Murdoch, Yellow Way Pioneer System, Inc., spoke extemporaneously on the subject. The following are abstracts and summaries of these papers.

## Long Haul Motor Coach Operator Speaks

Mr. Murdoch, speaking extemporaneously on long haul transportation, briefly reviewed the development of interstate motor coach transportation and its growth into transcontinental proportions. Seventy-five per cent of the business, he said, was "through" passenger and 25 per cent was tourist. A large part of the business is due to the number of people who desire to make the trip as cheaply as possible, the fare from New York to Los Angeles by railroad train being \$109 as compared to \$79.25 by motor coach. In addition, there were many travelers who preferred to travel by highway instead of by rail as it brought them in closer contact with the country.

The Yellow Way Pioneer System, he said, found that it could run motor coaches longer distances in the west than in the east. West of Chicago, division points are established from 400 to 500 miles apart, while east of Chicago, the divisions were only from 200 to 250 miles long. The coaches used by the Yellow Way in trans-

continental service are equipped with four-position seats having adjustable foot rests and a force system of ventilation. The company uses hotels for terminals and the baggage is handled by the hotel porters. This arrangement, he asserted, is a considerable improvement over railroad stations, as the terminal accommodations provided at the average railroad station do not compare with those afforded by a hotel.

From the standpoint of competition, he said, the company engaged in long-haul transportation between a number of cities has the advantage over companies engaged in only short-haul traffic between two cities. If the short-haul company lowers its rates, the company engaged in long-haul business can go still lower in local territory and make up any losses that may be incurred by increasing the revenue from other portions of the line.

One of the members asked Mr. Murdoch to give his opinion as to interstate regulation. He replied that it was his belief that most of the motor coach operators wanted federal regulation, as it would mean relief from the present necessity of having to comply with the requirements of different states and municipalities. Regulation, he said, would place interstate motor coach transportation on a sounder basis than at the present time. However, the companies engaged in long-haul transportation were striving to improve their plant and equipment so as to better meet the competition of the railroads. The railroads, he said, are managed by conservative men. They do not like to invest money in something of which they are not certain will be profitable. Undoubtedly, he said, when federal regulation comes into effect, the railroads will go into the motor coach business quite extensively. The present operating companies are now endeavoring to establish themselves so as to better meet this competition, which is bound to come. Thus, when the railroads decide to enter the highway field, it is going to cost them real money.

Mr. Murdoch predicted that the time was not far distant when hourly motor coach service would be established between New York and Los Angeles. Sleeping coaches, he said were still in the experimental stage. Coaches sleeping more than 12 people were too crowded to be comfortable. Also, a higher fare would have to be charged for those who desired to ride in a coach carrying only 12 passengers. Experience during the past few years has shown the motor coach patron places first importance on economy, and de luxe facilities are of secondary consideration. He wants the best service he can get for the lowest price possible.

## Getting and Holding Business for the Motor Truck

George W. Daniel in his paper, Getting and Holding Business for the Motor Truck, stressed the importance of setting prices for hauling with due consideration of operating costs. Of course, competition with the "fly-by-night" operator is severe, he said, but if a man or a company has an established reputation, it is easier for him to get business. The bulk of trucking must be solicited and in the efficiency of that solicitation, together with the submitting of rates scientifically arrived at,

must depend the prosperity of the business. Salesmanship in solicitation, he said, is a prominent factor, but more than mere salesmanship must be emphasized: service, reliability and personal interest. The personal touch in trucking means much. Rash promises given in the heat of service selling arguments are things to be avoided. Instead, requests should be made for an opportunity to study the needs of any given concern and to submit facts and figures accordingly.

It has been his experience that truck transportation has now sufficiently demonstrated its importance in the nation's economic scheme to permit any representative trucker to walk into the office of the head of a large industrial concern and place his service, his record and his reliability before him and to solicit business at first hand on his record. Mr. Daniels also discussed the need for prompt settlement of claims in holding business and the need for demonstrating financial responsibility in trucking operations. His discussion of handling claims practically paralleled the problems encountered by the railroads in handling freight business and the solutions he proposed are familiar to the railway traffic department officer.

The guileless trust, he said, which merchants will place in men who call themselves truckmen is surprising. The same men will run Dun's and Bradstreet's ragged getting credit references before they will sell \$500 worth of goods to a jobber. Yet, without any investigation whatever, they will frequently turn over thousands of dollars worth of freight to a truckman they never heard of until he offered a cut rate a few days before. If the merchants do not care to protect themselves, they should be protected by regulation which would entail the filing of a financial statement showing responsibility before any one can engage in the business of hauling for hire. In this way, too, the investment of truck operators who are carrying on a legitimate and responsible hauling business would also be conserved.

There is another angle to this, also, and that is the question of liability, liability for a more precious commodity than mere merchandise; namely, human life. Few of these irresponsible operators described are adequately covered by insurance or covered at all. Compulsory liability insurance has not been practical in Massachusetts, but perhaps measures of other types may be adopted eventually in all the states.

## Canadian Store-Door Delivery

By R. A. C. Henry

Director, Bureau of Economics, Canadian National

By store-door delivery is meant the function of moving freight from the terminus of the delivering railway carrier to the premises of the consignee on incoming traffic by rail and from the premises of the consignor to the terminus of the receiving rail carrier on traffic outbound by rail.

The present store-door delivery system in Canada was the result of an evolution, due to the co-ordination of interests extending over a considerable period of time. An early appreciation on the part of the old vehicular freighting companies, which used the highways before the advent of the railway, showed that their sphere of operation would necessarily be modified with the development of the steam railway. As a result, these companies recognized an economic condition which had to be met, and accordingly set about to readjust their sphere of operation in accordance with the changed conditions which were brought about by the

development of steam railways. This rearrangement took the form of coordination of interest through agreements between these cartage companies and railway companies as a result of which these old cartage companies became the media through which the railway distributed and collected especially its l.c.l. freight at the larger cities. The method at present adopted in carrying out the store-door delivery system is uniform in principle, although not precisely uniform in practice. This service is performed on behalf of the railways on the one hand and the shippers on the other, through the medium of subsidiary companies and through contracts between the railways and private trucking companies in the larger cities.

The Canadian Pacific early organized a subsidiary company, the Dominion Transport Company, to perform store-door delivery and similarly the Canadian Northern formed the Canadian Northern Transfer Company, now known as the Canadian National Transfer Company.

### Methods of Performance

While of necessity the contracts with official carters vary according to location, the salient features are the same and include the following. The cartage agents agree on their part to:

- 1—Be responsible for any loss or damage to goods while in their charge or for any loss to a consignee or consignor by reason of any undue delay in delivery.
- 2—Be responsible for the collection of all charges on the delivery sheets and for obtaining of consignee's signature on delivery.
- 3—Carry goods to whichever shed they are directed in cases where the railway has more than one shed in a city.
- 4—Furnish sufficient equipment and men to avoid unnecessary delay in delivery or collection.
- 5—Load and unload their vehicles from or to the floors of sheds, platforms or cars.
- 6—Adhere to hours of delivery and receipt of shipments prescribed by railway company.
- 7—Perform cartage services at schedule rates.
- 8—Only use stationery and forms provided by the railway.
- 9—In some cases, not to carry goods for other railway companies.

The railway company for its part agrees to:

- 1—Provide reasonable appliances for loading and unloading carters' vehicles but not to be expected to assist in such operations.
- 2—Supply a sufficient number of checkers and freight handlers so as not to unduly delay teams.
- 3—Provide all books, notices, forms of receipt, advice and shipping notes, delivery sheets, etc., necessary.
- 4—Provide reasonable office space on the company's premises for carter's agent.
- 5—Promote cartage business to a reasonable extent.
- 6—Transport carter's equipment, etc., at half-rate should such movement be necessary.

The railway company reserves the right, in the event of persistent undue delays in delivery, to put on necessary men and equipment at the carter's expense until the condition is remedied, reasonable allowance being made for climatic and other delays beyond the carter's control.

Store-door delivery service is performed only in centers where there is a sufficient volume of business to justify the railway in making an orderly arrangement for the receipt and delivery of l.c.l. freight traffic. In the smaller cities, where the volume of business is small, it is still the practice for the consignee or the shipper to receive his consignment of l.c.l. freight at the railway freight station and not at his door through any cartage company under contract with the railway, and likewise to deliver his shipment to the railway freight



station. At present, cartage is performed for the Canadian National as follows:

Province	City or Town	Population
Quebec	Montreal	1,000,000
	St. Hyacinthe	12,000
	Valleyfield	9,000
Ontario	Toronto	775,000
	Hamilton	150,000
	London	85,000
	Brantford	37,000
	Guelph	23,000
	Windsor	52,000
	Walkerville	7,500
	Chatham	19,000
	St. Catharines	22,000
	St. Thomas	17,000
Manitoba	Winnipeg	192,000
	Brandon	16,500
Saskatchewan	Regina	38,000
	Moose Jaw	19,000
	Saskatoon	31,000
	North Battleford	5,000
Alberta	Calgary	65,000
	Edmonton	65,000
British Columbia	Vancouver	215,000

The only practical difference between operators in eastern and western Canada are: in the west the teaming companies issue rate schedules themselves; in eastern Canada, incoming freight is taken by the cartage company for delivery, without advice from the consignee only when such consignee has a credit with the railway company. In the west, incoming cartage freight is given to the official carter without any order from the consignee unless definite instructions are issued to the contrary. In eastern Canada, the agents collect charges on all goods they deliver regardless of whether the consignee is on a credit list or not, while in the west, the railways collect from the consignees on the credit list the charges on goods the carters deliver. This means that the railways collect most of the charges.

[Mr. Henry also described some of the accounting features which arise in connection with this development by reason of the fact that payment and collections of freight charges are, in some of the larger centers, made by the cartage company on behalf of the railway, and also of certain credit features which have developed in connection with the freight and cartage charges.—Editor].

While store-door delivery is available in the larger cities in Canada, and may be used by the shippers and receivers of freight, it is not a compulsory service. In other words, the shipper on the one hand and the receiver on the other may make their own arrangements with respect to the handling of consignments of freight. But experience in Canada has indicated that this type of service is reasonably popular, more perhaps from the delivery side than from the receiving side from the railway point of view. Approximately 65 per cent of the l.c.l. freight handled through freight sheds in the cities where the store-door delivery service is available is handled by recognized agencies performing this service.

The benefits derived from the store-door delivery may be considered by the extent to which the service is used by the shipping public. To ascertain this, a study was made of the situation in Montreal, Que., Toronto, Ont., and Hamilton, Ont., from which the following data was obtained:

Percentage of Total L. C. L. Freight Handled by Official Cartage Companies for the Railroads

	Incoming, per cent	Outgoing, per cent	Total, per cent
Montreal	55.9	77.65	64.1
Toronto	57.8	72.8	63.1
Hamilton	63.1	71.4	63.1

From the above table, it will be seen that the cartage company's agents handle a much greater proportion of the total freight from the freight sheds than to them. This may be accounted for in two ways: The cartage companies being assured of a certain amount of business through their contracts with the railway company

do not solicit business actively but wait for telephone orders on business to the freight sheds. Of course, these cartage agents are not an integral part of the railway, with which they are allied, and are not directly concerned with increasing such a railway's business and in addition are subjected to inroads of the private trucker, who has, in many cases, rendered the service at a very low cost.

A further benefit indicated is the dispatch with which freight houses are cleared. This indicates the service rendered to the public on the one hand and the use made of the freight house facilities on the other.

In Montreal, store-door delivery service is performed by both a subsidiary company of the railway and by a cartage agent. The average time required for the distribution of 1,660 consignments received per day is as follows: 329 or 19.8 per cent are delivered on the same day as received by the railway company; 1,178 or 72.2 per cent are delivered the first day after receipt by the railway company; 85 or 5.1 per cent are delivered the second day after receipt by the railway company; 21 or 1.3 per cent are delivered the third day after receipt by the railway company and the balance is cleared by the fifth day.

As to delay at the railway's freight terminals in the three largest cities in Eastern Canada, we find that in Montreal and Toronto over 97 per cent of the inbound carted tonnage is delivered to the consignees by the second day after its receipt at the railway sheds, while in Hamilton practically the whole inbound carted tonnage has been delivered in this time.

Such service is invaluable to the shipping public, as it tends to permit the cutting down of stock because of the confidence in the ability of the carrier to give dispatch. The railway company, on the other hand, is able to co-ordinate its road service with its terminal service without undue delay or congestion.

During the Interstate Commerce Committee investigation of motor trucks and motor coaches, it was revealed that 32 per cent of all railway damage claims were paid on l.c.l. freight. Under such conditions, the value in dollars and cents of having goods delivered to consignees as quickly as possible after arrival at the terminal sheds of the railway cannot be computed, but is very considerable.

Since the creation of the Board of Railway Commissioners of Canada in 1903, the railway companies have been very careful to separate the functions performed by the cartage companies in connection with store-door delivery from the railway services manifestly covered by the railway rate tariffs, and have consequently held that the Board of Railway Commissioners have no authority over cartage rates or over cartage service.

In 1919, upon complaint by the Toronto Board of Trade against the cartage tariffs of the railway companies, the Board of Railway Commissioners of Canada decided to hold hearings for the presentation of any evidence relevant to such matters. The complaint was mainly against rates on "expected" articles in the schedules of new agreements made in 1919 with both Hendrie & Company and the Shedden Company. The Board of Trade represented that rates applicable to "excepted" articles, instead of being left to be quoted on application, should be carried in the tariff sheets.

Following this decision, the cartage service was continued; the burden of cost being borne by the users thereof. The tariffs, which have been filed showing the charges for cartage service, have been filed simply for the information of the public and as indicating the charges at which, under contracts entered into, the cartage companies are prepared to carry on this service.

# Making Trains and Motor Coaches Work Together

*The ways in which the Boston & Maine is carrying out its plan of supplementing railway with highway service*

By H. F. Fritch

Passenger Traffic Manager, Boston & Maine, and President, Boston & Maine Transportation Company

THE Boston & Maine has a large mileage of branch lines, forming a network of railroads between main lines in rather sparsely settled portions of northern New England, and the average length of haul of all passengers on the Boston & Maine is only 21 miles. These two factors make the problem of automobile competition more serious than in the case of some of the roads where the average length of haul is much greater and whose activities are confined more nearly to main line business.

The Boston & Maine has found the motor coach to be a very useful vehicle to use in substitution for all or part of the rail passenger service on branch lines. In some instances it has found communities very reluctant to give up rail service and take highway service, and it has also found some resistance on the part of commissions, who have not as yet come to a realization of the changed conditions brought about by the private automobile and the impossibility of continuing past practices which have become extravagances under existing conditions. On the other hand, some communities have found that, with highway service substituted in whole or in part for rail service, they are receiving a better transportation service than before. It has been found possible in some instances to increase the frequency of service and to give better and more connections with main line trains, and substantial economies have been made by this use of the motor coach.

## Supplementing Main Line Trains

The motor coach is also being used in connection with main line operations to make possible the elimination of local stops by through trains, with the motor coach filling in between the principal stopping points. This service has been helpful but not so successful as the one previously mentioned and the benefits are more intangible. Most railroad managements are today thoroughly convinced that they should cater to the long distance traveler by giving a fast service with few stops. This use of the motor coach makes possible the adequate service of intermediate points and at the same time improvements for long distance travelers.

Co-ordinated is defined as harmoniously adjusted. This has been the endeavor of the Boston & Maine in connection with motor coaches in branch line service. For the convenience of passengers, the motor coach service has been treated just as much like rail service as is possible. The schedules of the motor coaches are shown in the railroad time table folder in exactly the same manner as the train schedules. Railroad tickets are accepted on the motor coaches with the exception of some commutation tickets in particular instances. As a general rule, the railroad stations are used as stopping points except where they are not conveniently located

in the center of the town and at such places the more convenient point is used. In many instances the motor coaches carry baggage and mail, and for this type of operation a type of body was developed having a baggage compartment in the rear, capable of carrying several full size trunks and a rather large quantity of mail. Taxi-type seats are provided in this compartment so that passengers may be accommodated when necessary.

It has been thoroughly demonstrated that the coach is a useful means of continuing to provide organized transportation on lines of light traffic where in many instances it would be impossible to continue rail service on account of the declining volume of travel. This use of the motor coach will very largely increase as short distance travel by rail continues to be diverted to the private automobile, as highways paralleling railroads are improved and as the public and regulatory commissions can be convinced that this revision of method of furnishing transportation is a necessity and for the public good.

## The Question of Necessity

The problem of co-ordinating motor coach service supplementary to main line train service is more difficult, in that it is not always clear when public convenience and necessity require service in addition to that already being maintained.

The appearance of public demand does not always mean that there is public convenience and necessity. I would like to quote from a recent editorial in a New England paper: "That a large part of the public thinks thus and so, cannot be taken as a conclusive guarantee that the public is right, and that it thinks thus and so at present does not imply that it will always be of the same mind. . . . Overdoing transportation facilities, we may remind the reader, never pays in the end because those who operate the transportation lines must find a profit in the business somehow or other. The result of competition in public utility services may look at first as if it must lead to reduced rates and subsequent benefit, but such benefit is sometimes short lived. In order to make up for the lessened revenue produced by sub-divisions of the field and competitive bidding in the form of low rates, one conceivable effect is that those who do the business must economize in every other way. This usually means reduced service, a failure to make proper replacements, and resort to several other devices of which the public never thinks until it finds them hurtful."

The policy of the Boston & Maine is to furnish all organized transportation by rail or highway which public convenience and necessity requires in its territory, except, of course, where street railways or established, licensed motor coach lines are serving local requirements. Working on this policy the railroad, through its trans-

\* From an address before the Bus Division of the American Automobile Association at Cincinnati, Ohio, on June 28.



portation company, has in operation a number of longer distance lines, both intrastate and interstate. The operation of such lines in co-ordination with the rail service is difficult and there is a serious tendency to have them wholly competitive. The difference in running time of a motor coach line of any considerable length as compared with the train service makes it difficult to space the coach trips so as to fill in gaps in the train service unless they are exceedingly long ones. If they leave one terminal well spaced, they are not spaced at the other end. It has been found that where there are unusual scenic attractions to a route, the motor coach travel will assume considerable proportions, even if the rate of fare is on a parity with the rail fare, but that the greatest attraction to the motor coach lines is the lower rates which are in effect in a number of instances, and in some cases convenience as to location of the terminal.

The transportation company has been very much interested in determining whether its passengers have been diverted from the railroad or from the private automobile, or whether they constitute new business. Such studies as have been made indicate that a very large percentage would have moved by railroad if they had not availed themselves of the highway service.

#### All-Expense Tours Inaugurated

Northern New England is known throughout the country as an attractive summer resort territory with its beaches, lakes and mountains. The transportation company this season is operating a variety of all-expense tours, using combinations of motor coach and rail transportation, and it is the first extensive co-ordination of highway and rail that has come to my attention. Those tours which are entirely by motor coach are personally conducted and provision is made through railroad representatives to check up at frequent intervals with those traveling by train to assure them an enjoyable trip. The operation of these tours is consistent with the railroad's policy of furnishing all organized transportation which is needed in its territory and from the interest already shown, it is expected that these tours will be very successful and well patronized.

The Boston & Maine has taken on the motor coach as an ally and except on one route it is not today a serious competitor. The private automobile is changing and will continue to change the character and volume of rail travel. Fortunately the motor coach is available to be used by the railroad to meet these changed conditions. I suppose we must not expect the public and regulatory bodies to realize as quickly as we do that the characteristics of travel are changing, so it is the duty of those of us who are in the railroad business to show them the facts, and prove our case, showing that where traffic will not support the more expensive rail units, to change to the highway is a step forward, not backward, and that it will assure to the communities continued organized transportation so vital to their welfare.

THE AVERAGE COST OF OPERATING MOTOR COACHES in the United States in 1927 was 1.1 cents per seat for every mile as compared to 2.6 cents per seat for private automobiles, according to the Bus Division of the American Automobile Association.

The statement by the A.A.A. Bus Division is based on a study of motor coach operating costs of 66 representative companies which carried more than 400 million passengers at an average fare of 10.1 cents.

Fares constituted about 95 per cent of the total revenue of the average company in this group, while it paid \$8,700 for insurance, and almost \$37,500 or 1.6 cents per coach mile taxes.

## Motor Transport News

THE SEABOARD AIRLINE, through its highway subsidiary, the Motor Transportation Company of the South, recently inaugurated a parlor motor coach service between Jacksonville and Tallahassee, Fla. The service will be an extension of the present coach line between Jacksonville and Live Oak, and will supplement present train service between the two termini. Coaches will make three round trips daily over this route, which is a distance of 165 miles, and will be scheduled so as to enable passengers to make convenient connections with through Seaboard express trains.

IN MASSACHUSETTS, where a state-wide campaign for safety on the highway is to be carried on for the next six weeks, "stickers" are to be distributed, to be used on automobiles, calling for more careful and more frequent inspections of such vehicles. It is stated that in Pennsylvania, the enforcement of thorough inspection of brakes, at the instance of the state inspector, has reduced the monthly "death rate" from automobile collisions on the highway from 155 to 65; and that a similar movement in New Jersey resulted in reducing the "death rate" from 132 to 65. Massachusetts will provide for free inspections of cars at 3000 official inspection stations.

THE ST. LOUIS SOUTHWESTERN has organized a subsidiary, the Southwestern Transportation Company, to operate motor coaches in its territory. Daniel Upthegrove, president of the Cotton Belt, is president also of the Southwestern Transportation Company. D. W. Russell, formerly manager of the Little Rock, Ark., branch of the White Company, has been appointed vice-president and general manager of the Southwestern Transportation Company, and C. Messick, treasurer and assistant secretary of the Cotton Belt, has been appointed secretary and treasurer of the subsidiary company. Operating headquarters of the transportation company will be maintained at Little Rock, Ark., where Mr. Russell will have his office.

#### D. & R. G. W. Extends Motor Service

The operation by the Denver & Rio Grande Western of two passenger trains between Grand Junction, Colo., and Somerset, via Delta, Hotchkiss and Paonia, was discontinued on October 14. On the same day, the Western Slope Motor Way, Inc., subsidiary of the D. & R. G. W., began the provision of passenger, express and mail service by the operation of its motor coaches and trucks. Passenger trains are operated between Grand Junction and Somerset only during the heavy traffic months in the summer and fall, being replaced during the remainder of the year by the motor coach and truck service.

#### A. E. R. A. Continues Regulation Fight

Executives of the American Electric Railway Association during the convention at Cleveland, Ohio, on September 24, announced their intention to continue to press the fight for federal regulation of motor coaches engaged in interstate commerce, along the lines of the bill now pending before Congress. A survey was presented to the convention showing that 43 states and the District of Columbia are regulating intrastate common carrier motor coaches through their public service commissions. In addition, the Public Service Commission of Georgia and the Railroad and Warehouse Commission of Tennessee have held that they have jurisdiction over motor coaches but have not exercised their power. The states of Delaware, Florida and New Mexico are the only ones having no state motor coach regulatory laws.

#### Reading Expands Coach Operations

The New Jersey Board of Public Utility Commissioners has authorized the Reading Transportation Company to transport passengers between Atlantic City and Ocean City and to change its route between the two points to operate over the Longport-Ocean City bridge. No local business in intervening

communities will be handled, certificates for the operation of such service having been granted to a local electric line.

The Reading motor coaches will make connections with Reading Company trains at Atlantic City, providing more frequent service between Ocean City and Philadelphia than that now offered by direct train service.

The Reading Transportation Company has begun operation of its Reading-Hamburg (Pa.) line, 18 miles, certificates for this route having been acquired from an independent operator.

### Minnesota Truck Men Seek Joint Rates

A number of truck lines operating in Minnesota have made application before the Minnesota Railroad and Warehouse Commission to establish joint rates over the truck lines which would result in lower charges on inter-truckline shipments throughout the state. The railways of the state are opposing the application and at the first hearing contended that the commission must determine the convenience and necessity for joint rates between each line and between each point to be served by the combination rates. This objection was temporarily overruled, and the commission proceeded to hear testimony as to the general necessity for joint rates and the fairness of the schedule presented. It is estimated by the association of truck operators that approximately five per cent of the total business of the 23 lines included in the organization originates on one line and is consigned to a point on another line. A joint rate equal to about ninety per cent of the sum of the local rates is sought by the truck companies.

### Great Northern Starts First Motor Truck Line

The Great Northern, one of the largest steam railway operators of motor coaches, is now entering the field of motor truck operation. Through its motor coach operating subsidiary, the Northland Transportation Company, it has secured from the Minnesota Railroad and Warehouse Commission a certificate permitting motor truck operation between Grand Rapids, Minn., and Calumet, a distance of approximately twenty miles. At the same time it secured permission to discontinue two mixed trains between Calumet and Gunn, the latter being a town along the new truck route near Grand Rapids. According to press reports, it is estimated that a saving of \$10,000 a year will be effected through the substitution of motor truck for mixed train service. Passenger business on these trains has been negligible, the total passenger revenue in 1927 having been \$132.

The order of the commission granting the truck operating certificate specifies that the truck line paralleling the railway line will handle l.c.l. freight shipments and that it will handle only freight billed by the Great Northern at its railroad stations.

According to newspaper reports of a statement by Ralph

Budd, president of the Great Northern, it is not the intention of the Great Northern to go extensively into the trucking business, nor is the operation of this first truck route a move to start an extensive network of truck lines.

### Frisco Employees Ask Regulation For Interstate Highway Lines

Alarmed at the spread of unregulated motor coach and truck competition in the southwest, which is making deep inroads into the earnings of their railroad, 30,000 employees of the St. Louis-San Francisco are uniting to petition Congress to subject such companies engaged in interstate commerce to "just and fair" regulation.

The petitions, addressed "To our Senators and Representatives in Congress", call attention to the competition the railroads are contending with from unregulated and in many cases irresponsible motor coach and truck operators, and specifically ask Congress to include in the proposed bill for the regulation of common carrier motor vehicles operating interstate the following requirements: Proper protection against financial irresponsibility; fixed schedules upon which the public can depend to be furnished the year around; a proper tariff of freight and passenger charges, subject to the regulation of a proper commission; careful inspection of all motor vehicles to make certain they are safe for the uses to which they are to be devoted; proper investigation as to the mental and physical qualifications of drivers of such vehicles; provision for some regulatory body which can see that such transportation companies are efficiently and fairly operated; an adequate tax consistent with the value of the use of the public highways; and proper regulation covering the size of the vehicles used and prescribing safe speed regulation.

The idea of broadcasting the petitions originated with a Frisco dispatcher at Memphis, Tenn., who is president of the Veteran Employees' clubs at various points on the railroad. They will be recalled on November 15, when the number of signatures will be tabulated, and the various petitions sent to Washington to the senators from the nine states served by the Frisco.

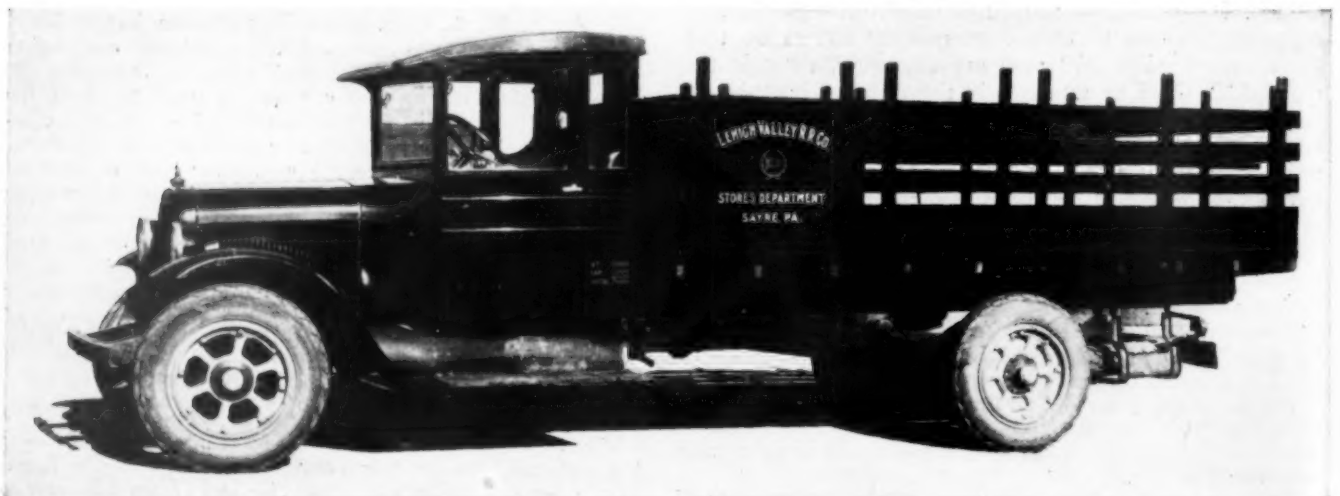
### Orders for Equipment

THE PENNSYLVANIA has purchased a Type-Y Yellow coach from the General Motors Truck Company.

THE SOUTHERN PACIFIC MOTOR TRANSPORT COMPANY has ordered two Type-W parlor motor coaches from the General Motors Truck Company, Pontiac, Mich.

THE WESTERN SLOPE MOTOR WAY, subsidiary of the Denver & Rio Grande Western, has accepted delivery of a Mack 6-cylinder, 29-passenger suburban coach.

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Graham Truck in Service on the Lehigh Valley